

**Федеральное государственное бюджетное учреждение науки Институт синтетических полимерных материалов им. Н.С. Ениколопова  
Российской академии наук**

**Центр исследования полимеров**

**Перечень публикаций, подготовленных по результатам работ, выполненных с использованием научного оборудования ЦКП  
за 2022 год**

№ п/п	ID	Вид публикации	Наименование публикации	DOI публикации	Автор(ы)	Издание, номер, год	ISSN / ISBN издания	Индексация издания	Краткое описание научных результатов, полученных на оборудовании ЦКП	Наличие в публикации ссылки на ЦКП	Страница, содержащая ссылку на ЦКП
1	1А	2	3	4	5	6	7	8	9	10	11
1.	3654987	Статья в научном журнале	A new linear phenyloxazole-benzothiadiazole luminophore: crystal growth, structure and fluorescence properties	10.1107/S2052520622001846	Valery A. Postnikov, Natalia I. Sorokina, Artem A. Kulishov, Maria S. Lyasnikova, Timofei A. Sorokin, Alexandra Ya. Freidzon, Anastasia S. Stepko, Oleg V. Borshchev, Maxim S. Skorotetsky, Nikolay M. Surin, S.A. Ponomarenko	Acta Crystallographica Section B Structural Science, Crystal Engineering and Materials, 2, 78, 2022	2052-5206	ВАК; Ринц; Web of Science; Scopus	A new linear luminophore consisting of five conjugated units of oxazole, phenylene and a central benzothiadiazole fragment, 4,7-bis[4-(1,3-oxazol-5-yl)phenyl]-2,1,3-benzothiadiazole, has been synthesized and characterized. Needle-like single-crystal samples up to 10 mm in length were obtained by physical vapor transport. The crystal structure was determined at 95 K and 293 K using single-crystal X-ray diffraction. With decreasing temperature, the space group P21/n does not change, but the unit-cell volume of the crystal decreases. The presence of intra- and intermolecular hydrogen bonds was established. Melting parameters ( $T_m = 305.5\text{C}$ , $H_m = 52.2\text{ kJ mol}^{-1}$ ) and the presence of a liquid-crystalline mesophase ( $TLC = 336.3\text{C}$ , $HLC = 1.4\text{ kJ mol}^{-1}$ ) were determined by differential scanning calorimetry and in situ thermal polarization optical microscopy studies. The presence of linear chains of hydrogen bonds ensures high stability of the crystal structure in a wide temperature range. The luminophore is characterized by a large Stokes shift (5120-5670 $\text{cm}^{-1}$ ) and a high quantum yield of fluorescence, reaching 96% in solutions (max = 517 nm) and 27% in thin crystalline films (max = 529 nm). The calculated absorption and emission spectra are in good agreement with the experimental data. Because of the excellent optical properties and high thermal stability, the new linear luminophore has great potential for application in organic photonics and optoelectronic devices.	Да (если в тексте публикации указано название ЦКП или УНУ)	268
2.	3653977	Статья в научном журнале	A universal approach to a structured polymer substrate for manufacturing a printed polymer gas sensor based on a field effect transistor	10.1007/s1172-022-3533-z	V. P. Chekusova, A. A. Trul, E. V. Agina, S. A. Ponomarenko	Russian Chemical Bulletin, 71, 2022	1066-5285	ВАК; Ринц; Web of Science; Scopus	Printed polymer field-effect transistors are promising devices for manufacturing highly sensitive gas and liquid sensors based on them. However, their practical application as sensors imposes special requirements on structured substrates for the deposition of active semiconductor and receptor layers. A simple approach to the production of a structured polymer substrate using exclusively additive methods for manufacturing from it a printed polymer field-effect transistor suitable for the use as a gas/liquid sensor is presented	Да (если в тексте публикации указано название ЦКП или УНУ)	1298

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1	1A	2	3	4	5	6	7	8	9	10	11
3.	3656103	Статья в научном журнале	Amphiphilic Molecular Brushes with Regular Polydimethylsiloxane Backbone and Poly-2-isopropyl-2-oxazoline Side Chains. 3. Influence of Grafting Density on Behavior in Organic and Aqueous Solutions	10.3390/poly m14235118	Serafim Rodchenko, Mikhail Kurlykin, Andrey Tenkovtsev, Sergey Milenin, Maria Sokolova, Alexander Yakimansky, Alexander Filippov	Polymers, 23, 14, 2022	2073-4360	ВАК; Ринц; Web of Science; Scopus	Regular and irregular molecular brushes with polydimethylsiloxane backbone and poly-2-isopropyl-2-oxazoline side chains have been synthesized. Prepared samples differed strongly in the side chain grafting density, namely, in the ratio of the lengths of spacer between the grafting points and the side chains. The hydrodynamic properties and molecular conformation of the synthesized grafted copolymers and their behavior in aqueous solutions on heating were studied by the methods of molecular hydrodynamics and optics. It was found that the regularity and the grafting density do not affect the molecular shape of the studied samples of molecular brushes in the selective solvent. On the contrary, the grafting density is one of the most important factors determining the thermoresponsivity of grafted copolymers. It was shown that in analyzing self-organization and LCST values in aqueous solutions of poly-2-isopropyl-2-oxazolines with complex architecture, many factors should be considered. First is the molar fraction of the hydrophobic fragment and the intramolecular density. It was found that molar mass is not a factor that greatly affects the phase transition temperature of poly-2-isopropyl-2-oxazolines solutions at a passage from one molecular architecture to another.	Да (если в тексте публикации указано название ЦКП или УНУ)	20
4.	3656110	Статья в научном журнале	Biocidal properties investigation of the new guanidine-containing alkoxy silanes and epoxy materials modified by them	10.1016/j.jorganchem.2021.122211	A.N. Tarasnikov, F.V. Drozdov, M.S. Parshina, E.N. Strukova, G.V. Cherkashev, A.M. Muzafarov	Journal of Organometallic Chemistry, 959, 2022	0022-328X	ВАК; Ринц; Web of Science; Scopus	This article presents a synthesis of stable guanidine-containing alkoxy silanes derivatives based on the synthesis procedure through amino derivatives and ylide of thiourea suggested previously. Amino- and mercapto-containing siloxane oligomers were synthesized by hydrolytic co-condensation based on the silanes thus obtained, and the biocidal activity of their aqueous solutions in comparison with the starting monomers was studied. The prospects of using the resulting compounds as biocidal additives to epoxy compositions and a high biocidal activity at their small concentrations in the cured material against S. aureus, E. coli, and C. albicans strains were demonstrated.	Да (если в тексте публикации указано название ЦКП или УНУ)	9

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1	1А	2	3	4	5	6	7	8	9	10	11
5.	3654279	Статья в научном журнале	Biorecognition Layer Based On Biotin-Containing [1]Benzothieno[3,2-b][1]benzothiophene Derivative for Biosensing by Electrolyte-Gated Organic Field-Effect Transistors	10.1021/acsaami.1c24109	Elena Yu. Poimanova, Polina A. Shaposhnik, Daniil S. Anisimov, Elena G. Zavyalova, Askold A. Trul, Maxim S. Skorotetcky, Oleg V. Borshchev, Dmitry Z. Vinnitskiy, Marina S. Polinskaya, Vadim B. Krylov, Nikolay E. Nifantiev	ACS Applied Materials & Interfaces, 14., 2022	1944-8244	ВАК; Ринц; Web of Science; Scopus	Requirements of speed and simplicity in testing stimulate the development of modern biosensors. Electrolyte-gated organic field-effect transistors (EGOFETs) are a promising platform for ultrasensitive, fast, and reliable detection of biological molecules for low-cost, point-of-care bioelectronic sensing. Biosensitivity of the EGOFET devices can be achieved by modification with receptors of one of the electronic active interfaces of the transistor gate or organic semiconductor surface. Functionalization of the latter gives the advantage in the creation of a planar architecture and compact devices for lab-on-chip design. Herein, we propose a universal, fast, and simple technique based on doctor blading and Langmuir–Schaefer methods for functionalization of the semiconducting surface of C8-BTBT-C8, allowing the fabrication of a large-scale biorecognition layer based on the novel functional derivative of BTBT-containing biotin fragments as a foundation for further biomodification. The fabricated devices are very efficient and operate stably in phosphatebuffered saline solution with high reproducibility of electrical properties in the EGOFET regime. The development of biorecognition properties of the proposed bilayer is based on the streptavidin–biotin interactions between the consecutive layers and can be used for a wide variety of receptors. As a proof-of-concept, we demonstrate the specific response of the BTBT-based biorecognition layer in EGOFETs to influenza A virus (H7N1 strain). The elaborated approach to biorecognition layer formation is appropriate but not limited to aptamer-based receptor molecules and can be further applied for fabricating several biosensors for various analytes on one substrate and paves the way for “electronic tongue” creation.	Да (если в тексте публикации указано название ЦКП или УНУ)	16474
6.	3656129	Статья в научном журнале	Comparative Analysis of Magnetorheological Effect in Soft Isotropic and Anisotropic Magnetoactive Elastomers	10.1134/S1560090422700579	S. A. Kostrov, V. V. Gorodov, A. M. Muzafarov, E. Yu. Kramarenko	Polymer Science, Series B, 64,6, 2022	1555-6123	ВАК; Ринц; Web of Science; Scopus	Magnetoactive elastomers based on polydimethylsiloxane and magnetic carbonyl iron microparticles with different distribution of the magnetic filler in the polymer matrix have been synthesized. Series of “soft” isotropic and anisotropic (synthesized in external magnetic field) samples without any low-molecular weight plasticizer and magnetic particles concentration 50–83 wt % have been obtained. Their viscoelastic properties in the absence of magnetic field and in the magnetic field with B = 1 T have been investigated. It has been shown that the values of the components of the dynamic shear modulus of anisotropic samples are more than twice higher in comparison with the isotropic analogs, their relative increase in the magnetic field being approximately the same. At the same time, the loss factor has been significantly decreased by the magnetic field application, reaching 0.1 for the composites with high content of the magnetic particles.	Да (если в тексте публикации указано название ЦКП или УНУ)	895

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1	1А	2	3	4	5	6	7	8	9	10	11
7.	3656140	Статья в научном журнале	Controllable Synthesis of Hybrid Dendrimers Composed of a Carbosilane Core and an Aromatic Shell: Does Size Matter?	10.3390/ijms232415461	Sofia N. Ardabevskaia, Elena S. Chamkina, Irina Yu. Krasnova, Sergey A. Milenin, Ekaterina A. Sukhova, Konstantin L. Boldyrev, Artem V. Bakirov, Olga A. Serenko, Zinaida B. Shifrina, Aziz M. Muzafarov	International Journal of Molecular Sciences, 24, 23, 2022	1422-0067	ВАК; Ринц; Web of Science; Scopus	The controllable synthesis of novel hybrid dendrimers composed of flexible and rigid components was accomplished via effective Cu-catalyzed azide-alkyne cycloaddition ("click") reaction between azide-functionalized carbosilane cores of two generations and monoethynyl-substituted hexaphenylbenzene dendron. A comprehensive analysis of the thermal and phase behavior of dendrimers allows us to detect a similar performance of dendrimers of both generations which, in our opinion, can be due to the similar ratio of rigid and flexible blocks in the dendrimers regardless the generation of carbosilane cores. The propensity to crystallization and ordering after the annealing procedure was confirmed by DSC and SWAXS. We found that hybrid dendrimers have a tendency to order depending on their constituents of different structures. This is in contrast to homogeneous dendrimers whose propensity to order is determined by the dendrimer molecule as a whole.	Да (если в тексте публикации указано название ЦКП или УНУ)	11
8.	3654981	Статья в научном журнале	Design Principles for Organic Small Molecule Hole-Transport Materials for Perovskite Solar Cells: Film Morphology Matters	10.1021/acsaem.1c03119	Alina F. Latypova, Nikita A. Emelianov, Dmitry O. Balakirev, Polina K. Sukhorukova, Nadezhda K. Kalinichenko, Petr M. Kuznetsov, Yuriy N. Luponosov, Sergey M. Aldoshin, Sergey A. Ponomarenko, Pavel A. Troshin, Lyubov A. Frolova	ACS Applied Energy Materials, 5, 2022	2574-0962	ВАК; Ринц; Web of Science; Scopus	High-efficiency n-i-p perovskite solar cells generally incorporate organic hole-transport layer materials such as spiro-OMeTAD or PTAA, which have intrinsically low charge carrier mobility and therefore require doping to improve transport properties. However, using dopants is known to affect badly the operational stability of perovskite solar cells. Therefore, the development of suitable dopant-free hole-transport materials is the critical issue for realizing perovskite solar cells with high efficiency and long operational lifetimes. Herein, a series of small molecules with triazatruxene, benzodithiophene, triphenylamine, and dithienosilole electron donor core units were designed and explored as solution-processed dopant-free hole-transport materials for perovskite solar cells. The best performance has been obtained using the triazatruxene-based molecule TAT-2T-CNA with terminal alkyl cyanoacetate groups and a 2,2'-bithiophene $\pi$ -conjugated bridge, which has enabled device efficiency of 20.1% with negligible hysteresis, along with a substantially improved VOC and FF values as compared to the reference devices assembled with PTA as a hole-transport material. The superior performance of TAT-2TCNA is attributed to the optimal optoelectronic properties of this material and, most importantly, defectless film morphology. Using scanning near-field infrared microscopy (IR-SNOM) technique was shown to be particularly useful for the detection and visualization of defects in thin films of hole-transport materials, which strongly correlate with the device performance. The results obtained in this work are expected to provide new insights facilitating the rational design of efficient dopant-free hole-transport materials for efficient and stable perovskite solar cells.	Да (если в тексте публикации указано название ЦКП или УНУ)	5402

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1	1А	2	3	4	5	6	7	8	9	10	11
9.	3656156	Статья в научном журнале	Effect of the Filler Type on the Properties of Epoxy-Anhydride Compound	10.1134/S2075113322050100	Yu. M. Yevtushenko, K. M. Borisov, G. P. Goncharuk, Yu. A. Grigor'ev, I. O. Kuchkina, M. S. Piskarev, V. G. Shevchenko	Inorganic Materials: Applied Research, 5, 13, 2022	2075-1133	ВАК; Ринц; Web of Science; Scopus	The properties of quartz flour, glass balls, and basalt powder as fillers of an epoxy-anhydride compound are studied, and the values of thermal conductivity of filler powders obtained by the probe method on an MIT-1 device according to GOST 30256 are presented. The rheological properties of the components of compounds A and B along with the corresponding mixed compositions on an MCR-92 device are studied. The solidified compounds are characterized by the methods of thermogravimetry and differential scanning calorimetry using an STA 449F3 Jupiter (NETZSCH) device. Using a Fluke PM 6303A RLC meter, the data on the frequency dependence of electrical resistance and the physical and mechanical properties of compounds using a Shimadzu AGSH tension testing machine are obtained. It is shown that the type of the filler determines the properties and formation of the polymer-filler interface as one of the key components of the composite material. The data on the effect of the type of fillers on the operational properties of molding compounds are obtained.	Да (если в тексте публикации указано название ЦКП или УНУ)	1366
10.	3656165	Статья в научном журнале	Environment Friendly Process toward Functional Polyorganosiloxanes with Different Chemical Structures through CuAAC Reaction	10.1021/acsp.2c01265	Kseniya A. Bezlepina, Sofia N. Ardabevskaia, Kseniia S. Klokova, Aleksei I. Ryzhkov, Dmitry A. Migulin, Fedor V. Drozdov, Georgij V. Cherkaev, Aziz M. Muzafarov, Sergey A. Milenin	ACS Applied Polymer Materials, 9, 4, 2022	2637-6105	ВАК; Ринц; Web of Science; Scopus	Despite the presence of many methods, which were created to date for the preparation, functionalization, and vulcanization of polysiloxanes, the development of materials based on silicones remains relevant and requires the introduction of new approaches that combine such modern strategies as atom-economical reactions, refusal to use harmful and dangerous organochlorosilanes, and using the principles of green chemistry and minimizing the use of solvents. In this work, we develop modern approaches to the preparation of both linear and branched polyorganosiloxanes containing azidopropyl functions at the silicon atom. In the first part of the work, it was shown that the proposed method for introducing these groups by catalytic rearrangement with the opening of cyclosiloxane is effective and makes it possible to obtain polysiloxanes with different contents of azidopropyl groups and different molecular weights. The second part of the work demonstrated the possibility of postpolymerization functionalization of such polymers by the mechanism of azide-alkyne cycloaddition under "green" conditions, without using solvents and amines. All of the most important functional fragments were introduced into the structures of organosilicon polymers by a single mechanism, under simple conditions, without the use of expensive catalysts, exposure to irradiation, and hazardous solvents. The combination of simplicity and versatility in the preparation of polysiloxanes with azidopropyl groups with the possibility of performing a click reaction makes it possible to directionally obtain the required materials based on universal raw materials and, as a result, can open up broad prospects for serious development and rethinking of the chemistry of silicones.	Да (если в тексте публикации указано название ЦКП или УНУ)	12

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1	1А	2	3	4	5	6	7	8	9	10	11
11.	3656187	Статья в научном журнале	Evidence for effect of macrocycle symmetry on radiation-induced ring opening in 18-crown-6 complexes with alkali-earth metal halogenides	10.1016/j.radphyschem.2022.110135	Sergey V. Nesterov, Olga A. Zakurdaeva, Natalya A. Sokolova, Pavel V. Rychkov, Vladimir I. Feldman	Radiation Physics and Chemistry, 196, 2022	0969-806X	ВАК; Ринц; Web of Science; Scopus	The complexes of 18-crown-6 with alkali-earth metal halides were synthesized to simulate the macrocyclic component of crown-containing extractants selective for radionuclide <sup>90</sup> Sr and to investigate the effect of cationic and anionic factors on its radiation destruction at low-temperature (77 K) irradiation. The halide anion was found to protect the complexes from ring opening at the initial stages of radiolysis due to positive charge transfer from the primary macrocyclic radical cation to anion. This effect was found in 18-crown-6 complexes with SrCl <sub>2</sub> , SrBr <sub>2</sub> and BaCl <sub>2</sub> , where the macrocycle had D <sub>3d</sub> symmetry. In contrast, the anionic protection was less efficient when the 18-crown-6 conformation was measurably distorted, as illustrated by the examples of complexes with SrI <sub>2</sub> , CaCl <sub>2</sub> and, especially, MgCl <sub>2</sub> with folded C <sub>2</sub> and D <sub>2</sub> symmetries. Based on the results obtained, it was concluded that preliminary conformational analysis of a macrocyclic complex could be a useful way to predict its resistance to radiation-induced polyether ring cleavage.	Да (если в тексте публикации указано название ЦКП или УНУ)	12
12.	3656241	Статья в научном журнале	Functional silsesquioxane polymers with branched perfluoroalkyl substituents: Synthesis and prospect applications	10.1016/j.eurpolymj.2022.111523	Ulyana S. Andropova, Fedor V. Drozdov, Petr D. Shkinev, Georgij V. Cherkaev, Lev L. Gervits, Olga A. Serenko, Aziz M. Muzafarov	European Polymer Journal, 178, 2022	0014-3057	ВАК; Ринц; Web of Science; Scopus	Condensation of alkoxysilanes in the active medium, which means acetic or trifluoroacetic acids, is a convenient and versatile method for preparing silsesquioxane copolymers with various functional groups. The method does not require the selection of special conditions, the use of additional solvents and catalysts. The obtained copolymers from poorly compatible monomers are homogeneous in composition without the use of additional solvents. Starting from commercially available functional triethoxysilanes and triethoxysilyl derivatives with branched tert-perfluorohexyl substituents (RF = CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> C(CF <sub>3</sub> ) <sub>2</sub> (CH <sub>2</sub> ) <sub>3</sub> -) under condensation in an active medium new functional silsesquioxane polymers with various groups (-NH <sub>2</sub> , -SH, or -COOH) were obtained. The synthesis techniques used provided a high yield of the resulting copolymers (91-94%). Despite the low compatibility of perfluoroalkyl organosilicon compounds with functional alkoxysilanes, the resulting copolymers are homogeneous in composition, which was confirmed by NMR and GPC. Copolymers are effective modifiers for the surface of materials. In particular, they were used as water repellents for cotton and polyamide fabrics. Modified surfaces of cotton and polyamide fabrics acquired highly hydrophobic properties (α > 120°). The presence of -NH <sub>2</sub> , -SH or -COOH groups in the chemical structure of fluorinated silsesquioxane copolymers provided high washing-resistant of modified cotton textile. For polyamide fabric, a similar effect was achieved where copolymers with -NH <sub>2</sub> or -SH groups were used. The COOH-containing copolymer coating on the polyamide textile do not provide resistance of the modified polyamide textile to repeated washing. Thus, we demonstrated that the new functional silsesquioxane polymers with branched perfluoroalkyl substituents and -NH <sub>2</sub> or -SH groups are versatile and efficient hydrophobic agents for both cotton and polyamide textiles.	Да (если в тексте публикации указано название ЦКП или УНУ)	11

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1	1А	2	3	4	5	6	7	8	9	10	11
13.	3653850	Статья в научном журнале	High-performance ternary solar cells by introducing a medium bandgap acceptor with complementary absorption, reducing energy disorder and enhancing glass transition temperature	10.1039/D2T A04463C	Ji Wan, Ivan Dyadishchev, Rui Sun, Qiang Wu, Yao Wu, Meimei Zhang, Svetlana Peregudova, Sergey Ponomarenko, Yuriy Luponosov, Jie Min	Journal of Materials Chemistry A, 10, 2022	2050-7488	ВАК; Ринц; Web of Science; Scopus	Owing to the relentless march of technology of non-fullerene acceptors (NFAs), ternary organic solar cells (TOSCs) are demonstrating impressive power conversion efficiencies (PCEs). More efficient boosting needs to be achieved in reducing the energy loss (Eloss) and enhancing the operational lifespan of TOSCs. Herein, we introduced a medium bandgap NFA, TPIIC, as the third component into PM6:Y6 host devices and found that the highly crystalline guest acceptor TPIIC with a relatively low lowest unoccupied molecular orbital, is miscible with the Y6 phase. Moreover, compared with the Y6 neat film, the Y6:TPIIC blend films show higher photoluminescence quantum yield, demonstrating the reduced energy disorder in ternary devices. Consequently, ternary devices exhibit reduced non-radiative recombination loss and delivered distinct improvements in the open-circuit voltage (VOC, 0.861 V) and PCE (17.7%) with a reduced Eloss of 0.535 eV, in comparison to the PM6:Y6 host devices (VOC ¼ 0.840 V, PCE ¼ 15.8% and Eloss ¼ 0.547 eV). Importantly, the role of TPIIC in increasing the glass transition temperature of the ternary blend is illustrated and its applicability for improving relevant stability issues of the host devices is verified. Overall, this study developed an effective means to simultaneously reduce the Eloss and improve operation stability of OSCs.	Да (если в тексте публикации указано название ЦКП или УНУ)	17129
14.	3653985	Статья в научном журнале	Highly electrochemically and thermally stable donor- $\pi$ -acceptor triphenylamine-based hole-transporting homopolymers via oxidative polymerization	10.1039/d2nj 01758j	Yuriy N. Luponosov, Alexander N. Solodukhin, Irina A. Chuyko, Svetlana M. Peregudova, Sergey A. Ponomarenko	New Journal of Chemistry, 46, 2022	1144-0546	ВАК; Ринц; Web of Science; Scopus	Development of organic semiconducting polymers combining simple and scalable synthesis with high stability, solubility and hole mobility is in high demand. In this work, we report two novel D-p-A triphenylamine-based homopolymers having thiophene as a side p-spacer linked to either hexyl- or 4- fluorophenyldicyanovinyl electron-withdrawing groups. The homopolymers can be easily synthesized via oxidative polymerization at room temperature of the corresponding monomers in the presence of FeCl3 as an oxidant. The polymers possess a number of valuable properties for application in organic and hybrid optoelectronics, among which are high electrochemical and thermal stability (Td is up to 594 1C; coke yield up to 90%), good solubility (up to 90 g L1 in chloroform), high glass transition temperature (up to 223 1C), efficient light absorption in the UV-Vis region, low-lying HOMO energy levels (ca. 5.36 eV) and sufficient hole mobility (up to 7 105 cm2 V1 s 1 ) without any posttreatment in thin films.	Да (если в тексте публикации указано название ЦКП или УНУ)	12316
15.	3656245	Статья в научном журнале	Hydrolytic polycondensation of diethoxymethylsilane under pressure	10.1007/s11 72-022-3574- 3	A. A. Kalinina, T. A. Pryakhina, E. V. Talalaeva, N. G. Vasilenko, M. A. Pigaleva, I. V. Elmanovich, M. O. Gallyamov, A. M. Muzafarov	Russian Chemical Bulletin, 8, 71, 2022	1066-5285	ВАК; Ринц; Web of Science; Scopus	The process of hydrolytic polycondensation of diethoxymethylsilane in water under pressure was investigated without the use of organic solvents in non-catalytic conditions and in carbonic acid. It is demonstrated that in both cases the process of the formation of methylsiloxane polymers proceeds with 100% conversion of the monomer and complete preservation of hydrosilyl groups. The conditions for the selective production of linear products were found.	Да (если в тексте публикации указано название ЦКП или УНУ)	1654

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1	1A	2	3	4	5	6	7	8	9	10	11
16.	3655001	Статья в научном журнале	In Situ Coupling Applied Voltage and Synchrotron Radiation: Operando Characterization of Transistors	10.1186/s11671-022-03662-y	Anton Davydok, Yuriy N. Luponosov, Sergey A. Ponomarenko, Souren Grigorian	Nanoscale Research Letters, 1, 17, 2022	1556-276X	ВАК; Ринц; Web of Science; Scopus	A compact voltage application setup has been developed for in situ electrical testing of organic field effect transistors in combination with X-ray scattering studies at a synchrotron beamlines. Challenges faced during real condition in-operando test of newly developed OFETs originated an idea of creation of a new setup which excludes number of factors that make experiments complicated. The application of the setup is demonstrated on a prototype of an organic transistors based on $\alpha,\omega$ -dihexyl- $\alpha$ -quaterthiophene molecules. The new setup allows to monitor material structural changes by X-ray scattering under applied voltage conditions and their direct correlations. The versatile setup eliminates possible shadowing effects and short circuits due to misalignment of the contacts. The electrical stability of the prototypes was characterized by the application of different voltage values. Corresponding structural changes were monitored by grazing X-ray scattering technique before, during and after the voltage was applied. The selected oligothiophene material with proved transistor properties shows high stability and directional anisotropy under applied voltage conditions. Thanks to a compact and flexible design of the setup, different type of small dimension devices could be studied under external voltage conditions at various synchrotron beamlines.	Да (если в тексте публикации указано название ЦКП или УНУ)	9
17.	3655491	Статья в научном журнале	Kinetic regularities of the synthesis of soluble polyimide by thermal imidization of polyamic acid in solution	10.1007/s11172-022-3532-0	A. V. Ustimov, A. Yu. Tsegelskaya, G. K. Semenova, A. A. Kuznetsov	Russian Chemical Bulletin, 6, 71, 2022	1066-5285	ВАК; Ринц; Web of Science; Scopus	Kinetic regularities of the synthesis of soluble polyimide by cyclization of polyamic acid in solution are investigated. The effective rate constants for the reactions of decomposition and imidization of polyamic acid occurring during imidization are determined depending on temperature. It is demonstrated that the negative deviation of the kinetics of the imidization of polyamic acid in solution from the first-order reaction equation is basically due to the influence of the polyamic acid decomposition with the formation of terminal amino groups.	Да (если в тексте публикации указано название ЦКП или УНУ)	5
18.	3656250	Статья в научном журнале	Low Dispersity Telechelic Polydimethylsiloxanes Synthesized in Ammonia Medium	10.1021/acsa pm.2c00669	Ekaterina Minyaylo, Maxim Temnikov, Anton Anisimov, Alexander Peregodov, Olga Shchegolikhina, Aziz Muzafarov	ACS Applied Polymer Materials, 8, 4, 2022	2637-6105	ВАК; Ринц; Web of Science; Scopus	The polymerization of hexamethylcyclotrisiloxane (D3 Me <sub>2</sub> ) in liquid ammonia using water as an initiator has been studied. These polymers are of practical importance for a wide range of applications in the silicone industry. The effect of factors such as temperature, reaction time, and concentration of reactants on the polymerization process was evaluated. As a result, an environmentally friendly procedure for the preparation of narrowly dispersed telechelic polydimethylsiloxanes (M <sub>n</sub> = 8.0 kDa, PDI = 1.11) with a monomer conversion of up to 98% was developed. The possibility of scaling up the process and recycling of ammonia was shown.	Да (если в тексте публикации указано название ЦКП или УНУ)	11



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1	1A	2	3	4	5	6	7	8	9	10	11
19.	3654010	Статья в научном журнале	Luminescence of Agrotexiles Based on Red-Light-Emitting Organic Luminophore and Polypropylene Spunbond Enhances the Growth and Photosynthesis of Vegetable Plants	10.3389/fpls.2022.827679	Robert Khramov, Anatoly Kosobryukhov, Vladimir Kreslavski, Dmitry Balakirev, Alexandra Khudyakova, Evgeniya Svidchenko, Nikolay Surin, Sergey Ponomarenko, Yuriy Luponosov	Frontiers in Plant Science, 13, 2022	1664-462X	ВАК; Ринц; Web of Science; Scopus	The impact of a light-transforming covering on photosynthetic activity and growth processes in lettuce and white cabbage plants grown in a glass greenhouse was studied. Plants were covered with agrotexile, a polypropylene (PP) nonwoven spunbond coated with polylactide varnish containing a new organic luminophore (LUM), which absorbs sunlight mainly in the 460-560 nm region and efficiently reradiates it in the red spectral region with a maximum at 660 nm. For comparison, simultaneously two references agrotexiles without LUM or containing a non-luminescent chromophore (ABS) with an absorption spectrum close to that of LUM were as well investigated. The use of the agrotexile with LUM resulted in a significant increase in total crude aboveground biomass for 32-, 33-, and 43-day-old plants on the average by 20-40%, and the photosynthesis rate increased on the average by 30-40% compared to the agrotexile without LUM. The use of the agrotexile with ABS mimicking the absorption of LUM also did not reveal a significant impact on photosynthesis and biomass accumulation in the plants as compared to the reference agrotexile coated only with the polylactide varnish. At the same time, the photosystem II activity (Fv/Fm and Fv/Fm quantum yields) was nearly the same in all experiments. When plants were grown under the light-converting agrotexile, the luminescent component of the converted light in the red spectrum region led to an increase in plant growth and photosynthesis rate, which is a fundamentally new result. Possible reasons for the stimulation of growth and photosynthesis due to the redistribution of the light spectral composition were analyzed. The use of covering materials containing luminophores similar to LUM can be promising in agrobiotechnology not only for green and vegetable crops but also for other field and greenhouse crops and various fruit bushes and trees.	Да (если в тексте публикации указано название ЦКП или УНУ)	9

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1	1A	2	3	4	5	6	7	8	9	10	11
20.	3653844	Статья в научном журнале	Luminescent 2D single crystals of thiophene-phenylene co-oligomers for field-effect devices	10.1039/D2Q M00768A	Roman S. Fedorenko, Alexey V. Kuevda, Vasily A. Trukhanov, Andrey Yu. Sosorev, Artem V. Bakirov, Artem I. Dorokhov, Nicolay M. Surin, Oleg V. Borshchev, Sergey A. Ponomarenko, Dmitry Yu. Paraschuk	Materials Chemistry Frontiers, 7, 2022	2052-1537	ВАК; Ринц; Web of Science; Scopus	Emissive materials that radiate polarized light are in high demand for a broad variety of light-emitting electronic devices. In organic light-emitting devices—light-emitting diodes and transistors—highly polarized emission from the device surface, the surface emission, can be achieved by the in-plane co-linear orientation of molecular transition dipole moments (TDMs) in the device active layer. Furthermore, such a TDM arrangement strongly alleviates the waveguiding effect, enhancing the performance of the device. In this work, we report the first practical implementation of these ideas in an organic light-emitting transistor. Highly emissive semiconductor single crystals were grown from a thiophene-phenylene co-oligomer 1,4-bis{5-[4-(trimethylsilyl)phenyl]thiophen-2-yl}benzene (TMS-PTPTMS) with trimethylsilyl (TMS) terminal substituents, which promote the in-plane TDM orientation. Organic light-emitting transistors based on TMS-PTPTMS showed ambipolar charge transport with efficient electroluminescence, and the single-crystal devices demonstrated linearly polarized electroluminescence with the polarization degree of 0.78 0.06. The observed polarization properties of both electro- and photoluminescence are in full agreement with the solved crystal structure and the corresponding calculations. Our findings indicate that smart control of in-plane ordered TDMs via molecular packing is a promising approach to designing materials for highly efficient light-emitting electronic devices.	Да (если в тексте публикации указано название ЦКП или УНУ)	3293
21.	3654997	Статья в научном журнале	Luminescent Coatings Based on (3-Aminopropyl)triethoxysilane and Europium Complex $\beta$ -Diketophosphazene	10.3390/poly m14040728	Violetta V. Maslennikova, Sergey N. Filatov, Alexey V. Orlov, Nikolay M. Surin, Evgeniya A. Svidchenko, Evgeniy M. Chistyakov	Polymers, 4, 14, 2022	2073-4360	ВАК; Ринц; Web of Science; Scopus	The reaction of $\beta$ -diketophosphazene with the europium (III) salt synthesized the corresponding metal complex which was structured with (3-aminopropyl)triethoxysilane and treated with dibenzoylmethane for additional coordination of europium atoms. The polymer thus obtained exhibits luminescence with a maximum of 615 nm, which is characteristic of europium. The polymer is thermally stable up to 300 °C, the coating based on it has a contact angle of 101°, and the adhesive strength of the coating to non-finished glass (according to ISO 2409: 2013) is 1 point.	Да (если в тексте публикации указано название ЦКП или УНУ)	8

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1	1A	2	3	4	5	6	7	8	9	10	11
22.	3654973	Статья в научном журнале	Luminescent High-Mobility 2D Organic Semiconductor Single Crystals	10.1002/aelm.202101281	Roman S. Fedorenko, Alexey V. Kuevda, Vasilij A. Trukhanov, Vladislav G. Konstantinov, Andrey Yu. Sosorev, Alina A. Sonina, Maxim S. Kazantsev, Nikolay M. Surin, Souren Grigorian, Oleg V. Borshchev, Sergey A. Ponomarenko	Advanced Electronic Materials, 7, 8, 2022	2199-160X	ВАК; Ринц; Web of Science; Scopus	2D organic semiconductor single crystals comprising one or a few molecular layers of macroscopic lateral sizes are ideal materials for ultrathin, flexible, and transparent field-effect devices—a platform for transistors and sensors. In recent years, these 2D materials have demonstrated high performance not inferior to their 3D counterparts. However, light emissive properties of 2D organic semiconductor single crystals have not yet been reported, and a combination of high charge-carrier mobility and bright luminescence in one material is still a challenge for 2D organic optoelectronics. Emissive high-mobility 2D organic semiconductor based on a [1]benzothieno[3,2-b] benzothiophene (BTBT)-derivative, 2,7-bis(4-decylphenyl)[1]benzothieno[3,2-b] [1]benzothiophene (DPBTBT), is presented here. DPBTBT molecules selforganize in large-area ultrathin single-crystalline films consisting of one or a few molecular layers. These 2D single crystals perfectly suit as an active layer of organic field-effect transistors in full accordance with Shockley's model and uniquely combine the high charge-carrier mobility reaching 7.5 cm <sup>2</sup> V <sup>-1</sup> s <sup>-1</sup> with prominent light emissive properties, which allow a demonstration of the first 2D organic light-emitting transistor. The high charge-carrier mobility and thermal stability of the crystalline phases, pronounced luminescence, and good shelf-life stability suggest that emissive BTBT-type molecules are a promising avenue for 2D organic optoelectronics.	Да (если в тексте публикации указано название ЦКП или УНУ)	2101281

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1	1A	2	3	4	5	6	7	8	9	10	11
23.	3653837	Статья в научном журнале	Luminescent push-pull triphenylamine-based molecules end-capped with various electron-withdrawing groups: Synthesis and properties	10.1016/j.dyepig.2022.110777	Dmitry O. Balakirev, Alexander N. Solodukhin, Svetlana M. Peregudova, Evgenia A. Svidchenko, Nikolay M. Surin, Yuriy V. Fedorov, Sergey A. Ponomarenko, Yuriy N. Luponosov	Dyes and Pigments, 208, 2022	0143-7208	ВАК; Ринц; Web of Science; Scopus	Organic luminescent materials are widely used in various electronic and optoelectronic devices upon growing demands of science and technology. Enhancement of spectral-luminescence characteristics for such materials and in depth understanding of "structure-property" relationships remain challenging tasks. Herein, we report on synthesis and comprehensive investigation of the series of novel luminescent push-pull molecules with triphenylamine unit as an electron donor block and thiophene as a $\pi$ -spacer, which end-capped with various types of electron-withdrawing groups (EWGs), which are commonly used for the molecular design of various functional materials in organic electronics. The results allowed us to evaluate the impact of EWG type used on the target materials characteristics. Phenyl-substituted EWGs were found to be more suitable for the design of highly thermally and electrochemically stable materials with relatively high melting temperatures and melting enthalpies. Depending on the EWG nature luminescence maxima of the luminophores demonstrated significant variability, e.g. from 509 nm to 750 nm, while the photoluminescence quantum yield (PLQY) values laid in the range of 1-89%. All luminophores showed good compatibility with a polystyrene (PS) matrix, in which PLQYs were generally higher (up to 25-fold enhancement) compared to the corresponding solutions or polycrystalline films. The changes of spectral characteristics observed for these luminophores were well described using basic relations of the semi-empirical theory of solvatochromism. Based on lifetime of excited states measurements, it was shown that the excited state non-radiative deactivation constants values the major contributors to PLQY values in THF solutions, while increase of the PLQY values in PS films can be associated with decrease of the probability of non-radiative deactivation of the excited states.	Да (если в тексте публикации указано название ЦКП или УНУ)	9

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1	1А	2	3	4	5	6	7	8	9	10	11
24.	3656255	Статья в научном журнале	Metalloalkoxysiloxanes-cured polydimethylsiloxane compositions filled with silica component for special applications: Dielectric and mechanical properties	10.3144/expresspolymlett.2022.62	Alexander N. Tarasenkov, Maria S. Parshina, Nadezhda A. Tebeneva, Kirill M. Borisov, Galina P. Goncharuk, Vitaliy G. Shevchenko, Sergey A. Ponomarenko, Aziz M. Muzafarov	Express Polymer Letters, 8, 16, 2022	1788-618X	ВАК; Ринц; Web of Science; Scopus	. The dielectric and mechanical properties of a wide range of polydimethylsiloxane-based compositions filled with silica component and cured with various metallosiloxanes have been studied. It is shown that the resulting systems are typical dielectrics. Silica component introduction in combination with the metal-siloxane network formation in the material can significantly increase its dielectric permittivity and conductivity in the frequency range <102 Hz compared to commercial silicon compounds and pure PDMS. It is found that varying the metallosiloxane structure and composition and the degree of silica filling are effective tools for changing the dielectric parameters of the material - up to ~5-10 at 1-10 Hz. By varying the functionality and length of the rubber chain, as well as the curing rate, it is possible to vary the mechanical properties of the material within a wide range - 2-10 MPa strength and elongation up to 500% with the pure elastomeric properties up to 200%. This approach to the formation of material opens up prospects for using such cured systems as dielectric elastomers for special applications such as flexible capacitive sensors or actuators for medical and robotic applications.	Да (если в тексте публикации указано название ЦКП или УНУ)	867
25.	3656278	Статья в научном журнале	New cross-linked polysiloxanes prepared by UV-induced thiol-ene click-reaction	10.1016/j.polymer.2022.125203	D.A. Lokteva, Yu.N. Kononevich, M.N. Temnikov, P.A. Nezhnyy, E.E. Kim, D.A. Khanin, G.G. Nikiforova, A.M. Muzafarov	Polymer, , 256, 2022	0032-3861	ВАК; Ринц; Web of Science; Scopus	A series of new cross-linked polysiloxane polymers based on functionalized cyclo- and oligosiloxane precursors was prepared by UV-induced hydrothiolation "click"-reaction using DMPA as the initiator and their physicomechanical properties were studied. The study of a morphology of prepared polymers by scanning electron microscopy (SEM) shows that the microstructure of all samples is homogenous. The mechanical properties of all the samples were studied by the tension and compression tests. It was shown that mechanical properties of studied materials, which significantly depends on precursors nature, can be fine-tuned by changing the structure of the initial vinyl precursor. The Young's modulus varies in the range of 4.5-117 MPa in the tension test and in the range of 6.3-209 MPa in the compression test. The tensile strength varies in the range of 0.3-3.9 MPa in the tension test and in the range of 2.3-28 MPa in the compression test. The thermal stability of the samples was evaluated by thermal gravimetric analysis (TGA). The weight loss was observed in the range of 275-333 °C in air and 322-370 °C in argon for prepared samples. All samples were characterized by DSC method. It was shown that only DSC curves for polymers 1 and 3 contain transitions related to glass formation (- 78 and - 35 °C, respectively). All polymer samples have a similar water contact angle in the range of 90-102°.	Да (если в тексте публикации указано название ЦКП или УНУ)	9

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1	1А	2	3	4	5	6	7	8	9	10	11
26.	3655908	Статья в научном журнале	New imide-based thermosets with propargyl ether groups for high temperature composite application	10.1016/j.polymer.2022.125038	Timofey I. Kolesnikov, Alexandra M. Orlova, Fedor V. Drozdov, Alexander I. Buzin, Georgij V. Cherkaev, Alexander S. Kechekyan, Petr V. Dmitryakov, Sergey I. Belousov, Alexander A. Kuznetsov	Polymer, 254, 2022	0032-3861	ВАК; Ринц; Web of Science; Scopus	Development of new thermosetting polyimides with good processability is highly demanded. Oligomers with two imide cycles (bisimides), containing propargyl ether groups using 4-aminophenyl propargyl ether were prepared for the first time. Bisimides were synthesized without using of toxic solvents in benzoic or acetic acids. Use of acids as solvent allows to combine synthesis of bisimides with reaction of removing tret-butylloxycarbonyl group from amine in one step. Chemical structure of bisimides was confirmed using <sup>1</sup> H, <sup>13</sup> C NMR, FT-IR and elemental analysis. Pre-polymers exhibited wide temperature processing window and good solubility in low boiling point organic solvents. Thermal curing was investigated using differential scanning calorimetry (DSC) and FT-IR analysis. Propargyl ether groups cross-link completely after 1 h at 300 °C. Thermogravimetric analysis (TGA) indicated that the temperatures of 10% weight loss of cured polymers in nitrogen and air atmosphere were in the ranges of 492-499 °C and 503-515 °C, respectively. Samples of Carbon fiber reinforced plastics (CFRP) were prepared using bisimides with propargyl ether groups and investigated by dynamic mechanical analysis (DMA) and scanning electron microscopy (SEM). CFRP demonstrated glass transition temperature in the range of 309-370 °C and homogeneous structure of cross-section sample. Therefore, new highly thermally stable thermosets with great processability, prepared by eco-friendly synthesis for using as high performance polymer matrix for CFRP were developed in our work.	Да (если в тексте публикации указано название ЦКП или УНУ)	9

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1	1А	2	3	4	5	6	7	8	9	10	11
27.	3656287	Статья в научном журнале	New types of hyperbranched 1,2,3-triazole-alkoxysiloxane functional polymers for metal embedded nanocomposite surface coatings	10.1039/d1sm01801a	Dmitry A. Migulin, Julia V. Rozanova, Vasily A. Migulin, Georgy V. Cherkaev, Ivan B. Meshkov, Alexey A. Zezin, Aziz M. Muzafarov	Soft Matter, 12, 18, 2022	1744-683X	ВАК; Ринц; Web of Science; Scopus	In this study, using the "click-chemistry" azide-alkyne cycloaddition reaction, two new types of polymers, namely, water-soluble amine-functional and water-insoluble pyridine-functional hyperbranched 1,2,3-triazoleorganoethoxysiloxane polymers, capable of stabilizing ultra-small silver nanoparticles and efficient for chemical surface modification were synthesized and characterized by <sup>1</sup> H-NMR, <sup>13</sup> C-NMR, <sup>29</sup> Si-NMR and FT-IR spectroscopy, MALDI and GPC. Coordinatively active hetero-organic polymers with a flexible branched polyethoxysiloxane backbone bearing chelating 1,2,3-triazolyl-dimethylamine and -pyridine conjugated functional groups were exploited towards coordination with Ag <sup>+</sup> metal ions, and formation and stabilization of narrowly dispersed silver nanoparticles (Ag-NPs) obtained in the process of radiation induced metal ion reduction. The influence of the chemically assisted radiation process on the Ag-NP size and size distribution was investigated. Hyperbranched polyorganoethoxysiloxanes loaded with Ag-NPs were covalently cross-linked on a Sto <sup>ber</sup> silica surface, demonstrating the efficiency of the developed hetero-organic functional polymers in the preparation of functional nanocomposite coatings for various applications (heterogeneous catalytic systems, antibacterial materials, nanoparticle-based optical sensing devices, etc.). The nanocomposites were investigated and characterized by TEM-EDS, DLS, UV-Vis spectroscopy and <sup>29</sup> Si MAS NMR spectroscopy	Да (если в тексте публикации указано название ЦКП или УНУ)	2450
28.	3655877	Статья в научном журнале	Novel organo-soluble poly(ether imide)s based on diethyltoluenediamine: Synthesis, characterization and gas transport properties	10.1016/j.polymer.2022.125258	Alexandra M. Orlova, Alexander Yu Alentiev, Timofey I. Kolesnikov, Anna Yu Tsegelskaya, Kristina Z. Monakhova, Sergey V. Chirkov, Roman Yu Nikiforov, Igor G. Abramov, Alexander A. Kuznetsov	Polymer, 256, 2022	0032-3861	ВАК; Ринц; Web of Science; Scopus	Novel dianhydrides containing bromine substituents were developed. Series of poly(ether imide)s (PEIs) using diethyltoluenediamine (DETDA) and several bis(ether anhydride)s containing bulky methyl, cyclohexylidene, isopropylidene, hexafluoroisopropylidene and bromine fragments was prepared by one-pot synthesis in benzoic acid. Chemical structures were confirmed by FT-IR and <sup>1</sup> H NMR spectroscopy. All PEIs demonstrated great solubility in organic solvents. The weight-average molecular weight (Mw) of the polymers were in the range of 6.1-11.3 × 10 <sup>4</sup> g/mol. PEIs showed glass transition temperature in the range of 285-315 °C according to DSC. Furthermore, PEIs demonstrated great thermal stability with degradation temperature (Td5%) higher 432 °C. Polymer films have good mechanical properties with tensile strength up to 91.6 MPa and elongation at break up to 89.4%. Correlation between the chemical structure and gas transport properties was investigated.	Да (если в тексте публикации указано название ЦКП или УНУ)	10

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1	1А	2	3	4	5	6	7	8	9	10	11
29.	3655130	Статья в научном журнале	Operationally Stable Ultrathin Organic Field Effect Transistors Based on Siloxane Dimers of Benzothieno[3,2-b][1]Benzothiophene Suitable for Ethanethiol Detection	10.1002/aelm.202101039	Askold A. Trul, Victoria P. Chekusova, Daniil S. Anisimov, Oleg V. Borshchev, Marina S. Polinskaya, Elena V. Agina, Sergey A. Ponomarenko	Advanced Electronic Materials, 5, 8, 2022	2199-160X	ВАК; Ринц; Web of Science; Scopus	Ultrathin organic field effect transistors (OFETs) demonstrate great potential as highly sensitive gas sensors since its electrical performance strongly depends on the environment. However, fabrication of high performance OFETs with reliable operational stability for continuous measurements by fast, rather simple, and inexpensive technique is still a challenge. Herein, electrical and sensing properties of ultrathin OFETs based on siloxane dimers of benzothieno[3,2-b][1]benzothiophene (BTBT) with different aliphatic spacer lengths fabricated by Langmuir-Blodgett, Langmuir-Schaefer (LS) or spin-coating techniques are studied, compared and optimized. Investigation of the influence of interface dielectric layer on electrical performance and operational stability of the devices allowed obtaining uniform low-defect ultrathin semiconducting layers responsible for improved electrical performance. Field-effect mobility up to 0.47 cm <sup>2</sup> V <sup>-1</sup> s <sup>-1</sup> is achieved for the devices based on the dimer with undecylenic spacer between the BTBT core and disiloxane central fragment fabricated by LS method on the top of poly(methyl methacrylate) interface layer. Promising operational stability lead to advanced sensory properties demonstrated by sensing of ethanethiol with the limit of detection of 30 ppb in the humid air, which is a record value for portable sensing technologies.	Да (если в тексте публикации указано название ЦКП или УНУ)	2101039
30.	3653821	Статья в научном журнале	Polarity Switching in Organic Electronic Devices via Terminal Substitution of Active-Layer Molecules	10.1021/acsaelm.2c01481	Dmitry I. Dominskiy, Oleg G. Kharlanov, Vasily A. Trukhanov, Andrey Yu. Sosorev, Nataliya I. Sorokina, Maxim S. Kazantsev, Eleonora F. Lazneva, Natalia B. Gerasimova, Vitaly S. Sobolev, Aleksei S. Komolov, Oleg V. Borshchev	ACS Applied Electronic Materials, 12, 4, 2022	2637-6113	ВАК; Ринц; Web of Science; Scopus	Organic electronic devices often suffer from poor charge injection limiting their performance. Specifically, high-performance electronic devices usually need Ohmic contacts, but it is not easy to realize them in junctions of the organic semiconductor with the electrodes because of the contact problems. In this work, polarity switching in organic field-effect transistors (OFETs) that is independent of the electrode work function is demonstrated. The switching of charge injection from the p-type to ambipolar and to the n-type via modification of the donor/acceptor character of the molecular terminal substituents. By using three thiophene-phenylene co-oligomers with the same conjugated core, similar crystal packings, but different terminal substituents (methyl, trimethylsilyl, and trifluoromethyl), the polarity switching in both thin-film and single-crystal OFETs is demonstrated. The ultraviolet photoelectron spectroscopy studies and electronic structure calculations justify a definitive role of the interface dipole stemming from the terminal groups in controlling the heights of charge injection barriers and hence in charge injection into the OFET active layer. The results obtained are expected to facilitate rational design of organic semiconductors for highperformance electronic devices.	Да (если в тексте публикации указано название ЦКП или УНУ)	9



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1	1А	2	3	4	5	6	7	8	9	10	11
31.	3653954	Статья в научном журнале	Polyvinylidene Fluoride Copolymers with Grafted Polyethyl Methacrylate Chains: Synthesis and Thermal and Dielectric Properties	10.1134/S181238222700138	E. A. Kleimyyuk, A.I. Kosyakova, A. I. Buzin, V. G. Shevchenko, Yu. N. Luponosov, S. A. Ponomarenko	Polymer Science, Series C, 64, 2022	1811-2382	ВАК; Ринц; Web of Science; Scopus	Polyvinylidene fluoride copolymers with grafted polyethyl methacrylate chains have been synthesized for the first time via photoinduced reversible deactivation radical polymerization. Binary and ternary copolymers of vinylidene fluoride with chlorotrifluoroethylene and trifluoroethylene were used as initial polymer chains for modification. The effect of the content of grafted chains on the thermal and dielectric properties of the copolymers has been studied. It has been shown that an increase in the content of grafted chains leads to a decrease in the degradation temperature, dielectric permittivity, and dielectric losses of the copolymers, but it significantly improves their film-forming properties due to a decrease in the degree of crystallinity.	Да (если в тексте публикации указано название ЦКП или УНУ)	209
32.	3655891	Статья в научном журнале	Solvent-free synthesis of thermoplastic polyetherimide based on 4-(3-aminophenoxy)phthalic acid	10.1007/s11172-022-3683-z	A. A. Kuznetsov, A. Yu. Tsegelskaya, M. S. Piskarev, A. E. Soldatova, V. L. Baklagin, I. G. Abramov	Russian Chemical Bulletin, 11, 71, 2022	1066-5285	ВАК; Ринц; Web of Science; Scopus	In the course of rheological studies carried out at 300 °C in an oscillating mode using a MCR 92 rheometer (Anton Paar, plane-to-plane cell, diameter 25 mm), the complex viscosity of the melt was measured, which, for a PEI sample synthesized with OI, turned out to be an order of magnitude lower than for the sample obtained in the absence of OI (Table 1). A significant difference in the rheology of PEI appears when comparing the accumulation modulus ( $G'$ ) and the loss modulus ( $G''$ ). $G' > G''$ for PEI obtained without OI. This corresponds to a system with viscoelastic properties. For PEI obtained with OI $G' < G''$ throughout the entire measurement (1 h), which characterizes this system as a viscous liquid. The characteristics of the synthesized PEI (Table 1) makes it possible to conclude that the proposed solution-free method for the synthesis of PEI allows obtaining of thermoplastic PEI that combines good thermal, physical, and mechanical properties with rheological properties rendering the possibility of processing by efficient melt methods.	Да (если в тексте публикации указано название ЦКП или УНУ)	3
33.	3654278	Статья в научном журнале	Synthesis and Aggregation Behavior of Novel Linear and Branched Oligothiophene-Containing Organosilicon Multipods	10.1002/ejoc.202101495	Marina S. Polinskaya, Yuriy N. Luponosov, Oleg V. Borshchev, Jochen Gülcher, Ulrich Ziener, Ahmed Mourran, Jingbo Wang, Mikhail I. Buzin, Aziz M. Muzafarov, Sergey A. Ponomarenko	European Journal of Organic Chemistry, 15, 2022	1434-193X	ВАК; Ринц; Web of Science; Scopus	The synthesis of novel oligothiophene-containing carbosilanesiloxanes of linear or branched structure with conjugation lengths of 4-7 thiophene rings, flexible aliphatic spacers varying from C3 to C11, and various degrees of branching of endcapping solubilizing groups is reported. The investigation of their phase behavior by differential scanning calorimetry and polarizing optical microscopy showed that although some of them can form liquid-crystalline phases, the majority of the linear molecules exhibits a high degree of crystallinity, which decreases with increasing degree of branching. Aggregation studies in dilute solutions in toluene at different temperatures allowed determination of the temperature and concentration dependence of their dissociation. The investigation of thin films prepared from dilute solutions revealed the formation of fibril domains confirming aggregation of the molecules.	Да (если в тексте публикации указано название ЦКП или УНУ)	11

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1	1А	2	3	4	5	6	7	8	9	10	11
34.	3653815	Статья в научном журнале	Synthesis and Photophysical Properties of Novel Meta-Conjugated Organic Molecules with 1,3,5-Benzene Branching Units	10.1021/acs.jpcc.2c05868	Maxim S. Skorotetcky, Nikolay M. Surin, Evgeniya A. Svidchenko, Sergey A. Pisarev, Yury V. Fedorov, Oleg V. Borshchev, Bogdan S. Kuleshov, Polina A. Shaposhnik, Olga A. Maloshitskaya, Sergey A. Ponomarenko	The Journal of Physical Chemistry B, 51, 126, 2022	1520-6106	ВАК; Ринц; Web of Science; Scopus	The synthesis and photophysical investigation of three novel meta-conjugated molecules based on 3,1,2-benzothiadiazole and thiophene-2,5-diyl derivatives linked through 1,3,5-benzene branching units are described. Each of them is a symmetrical molecule with two branching units, four identical lateral thiophene-containing fragments, and one central benzothiadiazole-containing fragment. To study the effect of the chemical structure on their photophysical properties, the molecules with different linearly conjugated lateral and central fragments due to incorporation of additional thiophene rings were synthesized and compared. It was shown that absorption spectra of the metaconjugated molecules can be represented as a sum of absorption bands of model compounds for their peripheral and central fragments containing a common benzene ring being branched at the 1,3,5-benzene unit in the meta-conjugated molecules. Therefore, they cannot be considered simply as isolated $\pi$ -conjugated systems of their peripheral and central fragments. Instead, DFT calculations showed that several transitions between the orbitals located in different regions of the meta-conjugated molecule are responsible for the formation of their absorption spectra, and they strongly depend on the degree of their overlapping. Theoretical absorption spectra reconstructed from the DFT data demonstrated a good agreement with the experimental results: the transitions with larger oscillator strength correspond to the bands with higher molar extinction coefficients and vice versa. It was shown that luminescence spectral maxima of the meta-conjugated molecules monotonically shift to the lower energy from 489 to 540 and 613 nm with increasing the number of thiophene rings in the peripheral and central fragments, respectively. However, luminescence quantum yield of the meta-conjugated molecules critically depends on the length of linearly conjugated fragments in its structure decreasing from 24% to 1.3% with increasing the number of thiophene rings in the lateral fragments but increasing to 90% in the molecule with more thiophene rings in both types of the fragments. The results obtained are well correlated to the ratio of radiative and nonradiative deactivation rate constants of the meta-conjugated molecules that indicates a high rate of internal conversion between the excited states corresponding to different fragments of the molecule. The CV measurements allowed estimating the HOMO, LUMO, and bandgap values of the target and model compounds, which confirm the presence of metaconjugation within the molecules investigated. Thus, connection of linearly conjugated fragments through meta-positions (metaconjugation) of a benzene ring leads to an intermediate option between fully conjugated and nonconjugated molecules due to partial delocalization of electron density through the 1,3,5-substituted benzene branching center.	Да (если в тексте публикации указано название ЦКП или УНУ)	13

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1	1А	2	3	4	5	6	7	8	9	10	11
35.	3656466	Статья в научном журнале	Synthesis and properties of MQ resins with phenyl groups in monofunctional units	10.1016/j.mencom.2022.03.003	Kirill M. Borisov, Alexandra A. Kalinina, Elena S. Bokova, Marina N. Ilyina, Georgii V. Cherkaev, Elena A. Tatarinova, Sergey A. Milenin, Aleksandra V. Bystrova, Martin Moeller, Aziz M. Muzafarov	Mendelevov Communications, 2, 32, 2022	0959-9436	ВАК; Ринц; Web of Science; Scopus	MQ resins have been prepared in acetic acid as an active medium from dimethylphenyl- or methylphenylethoxysilane as the M-components and tetraethoxysilane as the Q-component. All prepared samples with M/Q ratios of 1:1, 1:1.5, 1: 2, 1: 3, and 1: 4 were well soluble in organic solvents like toluene and THF. Compared to MQ resins with trimethylsilyl group as the M-component, the new MQ resins with phenyl substituents may possess improved compatibility to thermoplastic polymers, rubbers and coating formulations.	Да (если в тексте публикации указано название ЦКП или УНУ)	3
36.	3656471	Статья в научном журнале	Synthesis and properties of new siloxane with terminal azodyes functions based on eugenol	10.1002/app.52340	Aleksei I. Ryzhkov, Fedor V. Drozdov, Georgij V. Cherkaev, Mihail I. Buzin, Evgeniya A. Svidchenko, Aziz M. Muzafarov	Journal of Applied Polymer Science, 24, 139, 2022	0021-8995	ВАК; Ринц; Web of Science; Scopus	Currently, there is little literature data about the production of colored siloxanes with covalently bound dyes. However, the demand for such products remains very high. Colored siloxanes are needed in various fields: microfluidic devices, sensors, photosensitive materials. In this work, two azo dyes based on commercially available natural phenol, eugenol, were obtained: phenylazoeugenol (AE) and bis(phenylazo)eugenol (BAE). The dyes were introduced into the hydrosilylation reaction with siloxanes of different chain lengths (trisiloxane, pentasiloxane, and polysiloxanes). The siloxanes functionalized with dyes were characterized by NMR spectroscopy, GPC, TGA, and DSC. The optical properties of the resulting compounds were investigated. It has been shown that high-molecular colored siloxanes mix perfectly with organosilicon liquids and have an intense color even with the addition of small amounts of dye (1 wt. %), which makes these products very promising for producing colored damping fluids that will make it possible to detect the leakage of PMS in the machines and eliminate the problem in time.	Да (если в тексте публикации указано название ЦКП или УНУ)	11

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1	1А	2	3	4	5	6	7	8	9	10	11
37.	3653834	Статья в научном журнале	Synthesis and Thermal and Phase Behavior of Polysiloxanes with Grafted Dialkyl-Substituted [1]Benzo[thieno[3,2-b][1]benzothiophene Groups	10.1134/s1560090422700427	E. A. Zaborin, O. V. Borshchev, M. S. Skorotetskii, V. V. Gorodov, A. V. Bakirov, M. S. Polinskaya, S. N. Chvalun, S. A. Ponomarenko	Polymer Science, Series B, 0, 2022	1560-0904	ВАК; Ринц; Web of Science; Scopus	A number of novel polysiloxanes with grafted dialkyl-substituted [1]benzo[thieno[3,2-b][1]benzothiophene groups is synthesized by the hydrosilylation of polymethylsiloxane matrices with varying ratio of functional methylsiloxane and nonfunctional dimethylsiloxane fragments (1 : 5, 1 : 1, and 1 : 0) by reactive 2-undecenyl-7-hexyl-[1]benzo[thieno[3,2-b][1]benzothiophene. The obtained comb-shaped polymers have a number-average molecular weight of (6-43) × 10 <sup>3</sup> and a dispersity of 1.55-2.79. Study of the thermal and thermo-oxidative properties shows that the polymer, in which each second monomer unit contains [1]benzo[thieno[3,2-b][1]benzothiophene substituents, has the highest thermo-oxidative stability (413°C) and the smallest char residue at 700°C (3%). The lowest thermal stability is exhibited by the comb-shaped polymer with the 100% content of [1]benzo[thieno[3,2-b][1]benzothiophene fragments and the highest molecular weight for which a 5% weight loss starts at 274°C. The DSC study of the phase behavior of the synthesized polymers indicates that increase in the fraction of [1]benzo[thieno[3,2-b][1]benzothiophene fragments in monomer units and their molecular weight contributes to a rise in phase transition temperatures and reduction in their enthalpy compared with the monomer and the siloxane dimer of [1]benzo[thieno[3,2-b][1]benzothiophene. Introduction of 50 and 100% of [1]benzo[thieno[3,2-b][1]benzothiophene fragments into the siloxane polymer chain leads to the formation of liquid-crystalline mesophases with the enthalpy of transitions typical of smectics, as evidenced by polarizing microscopy and X-ray diffraction. For the polymers with the varied content of [1]benzo[thieno[3,2-b][1]benzothiophene fragments the values of the interlayer spacing in the smectic mesophase are determined, and their phase behavior is investigated. Effect of molecular weight on the packing of [1]benzo[thieno[3,2-b][1]benzothiophene is ascertained, and models for the interpenetration of side substituents in the obtained polymers are constructed.	Да (если в тексте публикации указано название ЦКП или УНУ)	13
38.	3656474	Статья в научном журнале	Synthesis of 1,1,3,3,5,5-Hexamethyl-7,7-diorganocyclotetrasiloxanes and Its Copolymers	10.3390/poly14010028	Evgeniya V. Talalaeva, Aleksandra A. Kalinina, Evgeniy V. Chernov, Alina G. Khmel'nitskaia, Marina A. Obrezkova, Georgii V. Cherkaev, Aziz M. Muzafarov	Polymers, 1, 14, 2022	2073-4360	ВАК; Ринц; Web of Science; Scopus	This paper reports a method for the synthesis of 1,1,3,3,5,5-hexamethyl-7,7-diorganocyclotetrasiloxanes by the interaction of 1,5-disodiumoxyhexamethylsiloxane with dichlorodiorganosilanes such as methyl-, methylvinyl-, methylphenyl-, diphenyl- and diethyl dichlorosilanes. Depending on the reaction conditions, the preparative yield of the target cyclotetrasiloxanes is 55-75%. Along with mixed cyclotetrasiloxanes, the proposed method leads to the formation of polymers with regular alternation of diorganosilyl and dimethylsilyl units. For example, in the case of dichlorodiethylsilane, 70% content of linear poly(diethyl)dimethylsiloxanes with regular alternation of units can be achieved in the reaction product. Using 7,7-diethyl-1,1,3,3,5,5-hexamethylcyclotetrasiloxane as an example, the prospects of the mixed cycle in copolymer preparation in comparison with the copolymerization of octamethyl- and octaethylcyclotetrasiloxanes are shown.	Да (если в тексте публикации указано название ЦКП или УНУ)	11

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1	1А	2	3	4	5	6	7	8	9	10	11
39.	3655883	Статья в научном журнале	Synthesis of Aromatic Polyimides Based on 3,4'-Oxydianiline by One-Pot Polycondensation in Molten Benzoic Acid and Their Application as Membrane Materials for Pervaporation	10.3390/ma15196845	Anastasiia E. Soldatova, Regina N. Shamsutdinova, Tatiana V. Plisko, Katsiaryna S. Burts, Anna Yu. Tsegelskaya, Dmitry A. Khanin, Kristina Z. Monakhova, Tikhon S. Kurkin, Alexandr V. Bilyukevich, Alexander A. Kuznetsov	Materials, 19, 15, 2022	1996-1944	ВАК; Ринц; Web of Science; Scopus	: A series of aromatic polyimides based on the asymmetrical diamine 3,4'-oxydianiline and various tetracarboxylic acid dianhydrides, both "rigid" and "flexible" structure, have been synthesized using the original method of one-pot high-temperature catalytic polycondensation in molten benzoic acid. The synthesized polyimides were investigated using fourier-transform infrared (FTIR) and <sup>1</sup> H NMR spectroscopy, gel permeation chromatography (GPC), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), thermomechanical analysis (TMA) and wideangle X-ray scattering (WAXS). It was found that the synthesized polyimides, depending on the used dianhydride, are characterized by different solubility in organic solvent and molten benzoic acid, molecular weight, glass transition temperature (T <sub>g</sub> ) from 198 to 270 °C, an amorphous or semi crystalline structure with the degree of crystallinity from 41 to 52%. The influence of the method of synthesis on the formation of the crystalline phase of polyimides was studied, and the obtained results were compared with the literature data. The effect of dianhydride chemical structure on the performance of polyimide in pervaporation more specifically, dehydration of azeotropic isopropanol solution was investigated and compared with the commercially available polyetherimide Ultem 1000™. Membrane structure was studied using scanning electron microscopy. It was found that polyimide PI-DA is the most effective for separation of 88 wt.% isopropanol/12 wt.% water mixture compared to the polyimide PI-6FDA and commercial polyetherimide Ultem 1000™ demonstrating normalized permeation flux of 2.77 kg μm m <sup>-2</sup> h <sup>-1</sup> and separation factor of 264 (water content in permeate 97 wt.%).	Да (если в тексте публикации указано название ЦКП или УНУ)	18
40.	3656478	Статья в научном журнале	Synthesis of Carbosilane and Carbosilane-Siloxane Dendrons Based on Limonene	10.3390/poly14163279	Aleksei I. Ryzhkov, Fedor V. Drozdov, Georgij V. Cherkaev, Aziz M. Muzafarov	Polymers, 16, 14, 2022	2073-4360	ВАК; Ринц; Web of Science; Scopus	In this work, carbosilane dendrons of the first, second, and third generations were obtained on the basis of a natural terpenoid, limonene. Previously, we have shown the possibility of selective hydrosilylation and hydrothiolation of limonene. It is proved that during hydrosilylation, only the isoprenyl double bond reacts, while the cyclohexene double bond does not undergo into the hydrosilylation reaction. However, the cyclohexene double bond reacts by hydrothiolation. This selectivity makes it possible to use limonene as a dendron growth center, while maintaining a useful function—a double bond at the focal point. Thus, the sequence of hydrosilylation and Grignard reactions based on limonene formed carbosilane dendrons. After that, the end groups were blocked by heptamethyltrisiloxane or butyllithium. The obtained substances were characterized using NMR spectroscopy, elemental analysis and GPC. Thus, the proposed methodology for the synthesis of carbosilane dendrons based on the natural terpenoid limonene opens up wide possibilities for obtaining various macromolecules: dendrimers, Janus dendrimers, dendronized polymers, and macroinitiators.	Да (если в тексте публикации указано название ЦКП или УНУ)	10

№ п/п	ID	Вид публикации	Наименование публикации	DOI публикации	Автор(ы)	Издание, номер, год	ISSN / ISBN издания	Индексация издания	Краткое описание научных результатов, полученных на оборудовании ЦКП	Наличие в публикации ссылки на ЦКП	Страница, содержащая ссылку на ЦКП
1	1А	2	3	4	5	6	7	8	9	10	11
41.	3655870	Статья в научном журнале	Synthesis of tetraarm stars with polyetherimide-polyether block copolymer arms	10.1007/s11172-022-3478-2	A. E. Soldatova, A. Yu. Tsegelskaya, G. K. Semenova, I. V. Bezsudnov, M. S. Polinskaya, I. G. Abramov, A. A. Kuznetsov	Russian Chemical Bulletin, 4, 71, 2022	1066-5285	ВАК; Ринц; Web of Science; Scopus	The method of one-stage catalytic polycyclocondensation according to the B4 + AB scheme was used to synthesize new tetraarm star-shaped oligoimides (SOIs) with terminal amino groups and a variable average arm's length. A new tetraamine obtained by condensation of m-phenylenediamine with a di-Boc derivative of 3,5-diaminobenzoic acid was used as a branching center (B4). 4-(3-Aminophenoxy)phthalic acid was used as the AB heteromonomer. The end amino groups were converted into carboxyl groups by treatment of the resulting reaction SOIs with trimellitic anhydride. The subsequent grafting of an oligoalkylene oxide oligomer with a terminal amino group onto them yielded the stars with block copolymer arms. The chemical and morphological structure of new block copolymer stars has been studied by IR and <sup>1</sup> H NMR spectroscopies, TGA and SEM. It was established by the SEM method that the synthesized objects have a two-phase morphology	Да (если в тексте публикации указано название ЦКП или УНУ)	10
42.	3656487	Статья в научном журнале	Структура и свойства нанокомпозитов на основе полиимидов разной химической структуры и металлоалкоксисилоксанов	10.31857/S1028096022080027	У. С. Андропова, О. А. Серенко, Е. С. Афанасьев, Д. А. Сапожников, В. Н. Черник, Л. С. Новиков	ПОВЕРХНОСТЬ. РЕНТГЕНОВСКИЕ, СИНХРОТРОННЫЕ И НЕЙТРОННЫЕ ИССЛЕДОВАНИЯ, 8, 2022	1028-0960	ВАК; Ринц; Web of Science; Scopus	Исследованы морфология и физические свойства нанокомпозитов на основе органорастворимых полиимидов разной химической структуры. В качестве прекурсоров дисперсной фазы были использованы металлоалкоксисилоксаны, различающиеся типом центрального атома металла и заместителем при атоме кремния, а именно, трис-(3-аминопропилдиэтоксисилокси)хром, трис-(метилдиэтоксисилокси)галлий и тетракис-(метилдиэтоксисилокси)титан. Показано, что разница химической структуры матричного полимера при условии использования одного и того же прекурсора дисперсной фазы нанокомпозита проявляется в изменении формы и размеров, образующихся в полимере наночастиц. Наполненные полиимидные пленки характеризуются высокой стойкостью к воздействию атомарного кислорода. Значения коэффициентов эрозии нанокомпозитов на их основе при использовании тетракис-(метилдиэтоксисилокси)титана на 89% меньше по сравнению с ненаполненными полиимидами. Способность наполненных полимерных пленок противостоять эрозионному воздействию набегающей кислородной плазмы обусловлена в большей мере наночастицами дисперсной фазы. Защитная функция наночастиц повышается с ростом количества Si-O-Si-блоков в их структуре, которое, в свою очередь, предопределяется валентностью центрального атома металла прекурсора. Так, полиимиды с частицами на основе тетракис-(метилдиэтоксисилокси)титана менее подвержены эрозии под воздействием атомарного кислорода, чем в случае нанокомпозитов, дисперсная фаза которых сформирована на основе трис-(3-аминопропилдиэтоксисилокси)хрома, трис-(метилдиэтоксисилокси)галлия. Химическая структура матричного полимера мало влияет на значения коэффициентов эрозии наполненных полиимидных пленок.	Да (если в тексте публикации указано название ЦКП или УНУ)	9

