

**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 2021 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	1A	2	3	4	5	6	7	8	9	10	11
1.	3126146	Статья в научном журнале	Acid-Catalyzed Rearrangement of Azidopropyl-Siloxane Monomers for the Synthesis of Polydimethylsiloxane and Their Carboxylic Acid Derivatives	10.1021/acs.macromol.0c02790	Milenin, S.A., , Drozdov, F.V., , Bezlepkina, K.A., , Majorov, V.Y., , Muzafarov, A.M.	Macromolecules, 54, 2021	0024-9297	ВАК; Ринц; Web of Science; Scopus	In this work, we were the first to show the possibility of synthesizing polydimethylsiloxanes (PDMSs) with azidopropyl-functional groups at the silicon atom by the classical methods for PDMS synthesis, that is, ring-opening polymerization (ROP) and catalytic rearrangement of siloxanes in the presence of a strong acid (CF ₃ SO ₃ H). The suggested method was used to obtain PDMSs containing azidopropyl-functional groups at both ends of the polymer chain (telechelics) as well as PDMSs with irregular structures containing different fractions (5-50%) of azidopropyl-functional groups in the main polymer chain. The suggested method also proved to be efficient for synthesizing PDMSs containing both azidopropyl- and hydridosilyl-functional groups simultaneously. As a result, PDMSs with different mutual arrangements of two types of functional groups along the PDMS chain were obtained. The method for the catalytic rearrangement of low-molecular-weight siloxanes that we used made it possible to obtain azidopropyl-functional PDMSs in a wide range of molecular weights from 2000 to 88,000 according to gel permeation chromatography (GPC) data. The possibility of further modification of the resulting azidopropyl-functional PDMS, as well as multifunctional PDMSs containing azidopropyl- and hydridosilyl-functional groups simultaneously, by azide-alkyne cycloaddition reactions was demonstrated. The polymers obtained were characterized by ¹ H and ²⁹ Si NMR spectroscopy and by GPC.	Да (если в тексте публикации указано название ЦКП или УНУ)	2933

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1	1А	2	3	4	5	6	7	8	9	10	11
2.	3129913	Статья в научном журнале	Biomacromolecules as stabilizers for polymeric microcarriers fabrication	10.3390/polym13183045	T.S. Demina, L.A. Kilyashova, T.N. Popyrina, E.A. Svidchenko, S. Bhuniya и др.	Polymers, 13(18), 2021	2073-4360	ВАК; Ринц; Web of Science; Scopus	Biodegradable polymeric microparticles are widely used in drug delivery systems with prolonged-release profiles and/or cell microcarriers. Their fabrication via the oil/water emulsion solvent evaporation technique has normally required emulsifiers in the aqueous phase. The present work aims to evaluate the effectiveness of various polysaccharides, such as chitosan, hyaluronic acid, cellulose, arabinogalactan, guar and their derivatives, as an alternative to synthetic surfactants for polylactide microparticle stabilization during their fabrication. Targeted modification of the biopolymer's chemical structure was also tested as a tool to enhance polysaccharides' emulsifying ability. The transformation of biomacromolecules into a form of nanoparticle via bottom-up or top-down methods and their subsequent application for microparticle fabrication via the Pickering emulsion solvent evaporation technique was useful as a one-step approach towards the preparation of core/shell microparticles. The effect of polysaccharides' chemical structure and the form of their application on the polylactide microparticles' total yield, size distribution and morphology was evaluated. The application of polysaccharides has great potential in terms of the development of green chemistry and the biocompatibility of the formed microparticles, which is especially important in biomedicine application.	Да (если в тексте публикации указано название ЦКП или УНУ)	8

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3.	3129857	Статья в научном журнале	Branched Electron-Donor Core Effect in D-π-A Star-Shaped Small Molecules on Their Properties and Performance in Single-Component and Bulk-Heterojunction Organic Solar Cells	10.3390/en14123596	A. N. Solodukhin, Yu. N. Luponosov, A. L. Mannanov, P.S. Savchenko, A.V. Bakirov и др.	Energies, 14(12), 2021	1996-1073	ВАК; Ринц; Web of Science; Scopus	Star-shaped donor-acceptor molecules are full of promise for organic photovoltaics and electronics. However, the effect of the branching core on physicochemical properties, charge transport and photovoltaic performance of such donor-acceptor materials in single-component (SC) and bulk heterojunction (BHJ) organic solar cells has not been thoroughly addressed. This work shows the comprehensive investigation of six star-shaped donor-acceptor molecules with terminal hexyldicyanovinyl blocks linked through 2,2'-bithiophene π-conjugated bridge to different electron-donating cores such as the pristine and fused triphenylamine, tris(2-methoxyphenyl)amine, carbazole- and benzotriindole-based units. Variation of the branching core strongly impacts on such important properties as the solubility, highest occupied molecular orbital energy, optical absorption, phase behavior, molecular packing and also on the charge-carrier mobility. The performance of SC or BHJ organic solar cells are comprehensively studied and compared. The results obtained provide insight on how to predict and fine-tune photovoltaic performance as well as properties of donor-acceptor star-shaped molecules for organic solar cells.	Да (если в тексте публикации указано название ЦКП или УНУ)	11

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4.	3127118	Статья в научном журнале	Chemical aspects of the radiation stability of macrocyclic extractants designed for 90Sr separation	10.1016/j.mencom.2021.01.037	Nesterov, S.V., , Zakurdaeva, O.A.	Mendelev Communications, 31 (1), 2021	1364551X	ВАК; Ринц; Web of Science; Scopus	The contact of crown ether/ionic liquid extractants with nitric acid solutions results in macrocycle protonation, which complicates the radiolysis mechanism and increases the radiation destruction of the system. This trend is caused by the scavenging of secondary electrons by H3O+ ions at the early stages of the process. The revealed channel of the radiation-chemical transformations was not taken into account in the previous models of testing the radiation resistance of crown-containing compositions designed for 90Sr removal from radioactive wastes.	Да (если в тексте публикации указано название ЦКП или УНУ)	120

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5.	3129847	Статья в научном журнале	Dual-curing propargyl-phthalonitrile imide-based thermoset: Synthesis, characterization and curing behavior	10.1016/j.eurpolymj.2021.110865	Kolesnikov Timofey I., Orlova Alexandra M., Tsegelskaya Anna Y., Cherkaev Georgij V., Kechekyan Alexander S.	European Polymer Journal, 161, 2021	0014-3057	ВАК; Ринц; Web of Science; Scopus	Oligoimide containing propargyl and phthalonitrile groups in one molecule (OI-PR-PN) was synthesized by a facile and eco-friendly method in benzoic acid melt. To incorporate side propargyl groups into the polyimide backbone, a new monomer was developed - 5-(2-propyn-1-yloxy) benzene-1,3-diamine (PBD). The OI-PR-PN dual-curing behavior was studied by DSC and FT-IR methods. The curing of phthalonitrile groups can be promoted by the intermediates formed during the propargyl groups polymerization. This allows cross-linking of phthalonitrile groups at 300-350 °C in one component system. OI-PR-PN showed good solubility in low boiling point solvents and had low melt viscosity (up to 8 Pa·s at 250 °C). The temperatures of 10% weight loss of the cross-linked OI-PR-PN and oligoimide containing only propargyl groups (OI-PR) are 496 °C and 450 °C correspondingly. The completely cured OI-PR-PN glass transition temperature measured by dynamic mechanical analysis was 424 °C with a storage modulus 4.2 GPa at 50 °C. The possibility of cross-linking without using curing additives with a combination of excellent thermal and mechanical properties indicates the potential of OI-PR-PN as a matrix for composite manufacturing.	Да (если в тексте публикации указано название ЦКП или УНУ)	10

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6.	3127119	Статья в научном журнале	Effect of silane functionalization on properties of poly(Lactic acid)/palygorskite nanocomposites	10.3390/inorganics9010003	Kasprzhitskii, A., , Lazorenko, G., , Kruglikov, A., , Kuchkina, I., , Gorodov, V.	Inorganics, 9 (1), 2021	2304-6740	ВАК; Ринц; Web of Science; Scopus	Poly(lactic acid) (PLA)/palygorskite (Paly) nanocomposites were prepared using the melt compounding technique. Paly modified by 3-aminopropyltriethoxysilane (APTES) and vinyltrimethoxysilane (VTMS) was used as nanofiller for PLA with concentrations in the 1-7 wt% range. It has been found that the functionalization allows a covalent bond between the hydroxyl groups of the Paly and the PLA matrix, evidenced by the improvement in mechanical properties. Paly modification with VTMS has better properties compared with Pale modification with APTES. This indicates a better adhesion between the Paly-VTMS and PLA matrix, and a good dispersion of the nanofiller in the polymer matrix.	Да (если в тексте публикации указано название ЦКП или УНУ)	9
7.	3129853	Статья в научном журнале	Effect of the chemical structure of chitosan copolymers with oligolactides on the morphology and properties of macroporous hydrogels based on them	10.1134/S1560090421050109	T.N. Popyrina, E.A. Svidchenko, T.S. Demina, T.A. Akopova, A.N. Zelenetsky	Polymer Science, Series B, 63, 2021	1560-0904	ВАК; Ринц; Web of Science; Scopus	Materials in the form of thermally crosslinked films and macroporous hydrogels based on graft copolymers of chitosan with lactide oligomers of various stereochemical compositions synthesized by solid-state reactive extrusion are obtained and studied. It is shown that the chemical structure of the copolymers and the molecular weight of the initial chitosan significantly affect the morphology and properties of the materials. The heterogeneous morphology of materials based on the semicrystalline lactide oligomer leads to a decrease in the efficiency of crosslinking of the materials during heat treatment and a higher degree of moisture absorption of macroporous hydrogels.	Да (если в тексте публикации указано название ЦКП или УНУ)	542

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1	1А	2	3	4	5	6	7	8	9	10	11
8.	3126093	Статья в научном журнале	Effects of electron-withdrawing group and π -conjugation length in donor-acceptor oligothiophenes on their properties and performance in non-fullerene organic solar cells	10.1016/j.ypig.2021.109592	Kalinichenko, N.K., Balakirev, D.O., Savchenko, P.S., Mannanov, A.L., Peregodova, S.M. и др.	Dyes and Pigments, 194, 2021	1873-3743	ВАК; Ринц; Web of Science; Scopus	The development of small-molecule donor materials for highly efficient non-fullerene (NF) organic solar cells (OSC) remains an urgent research task. In this work, the synthesis of donor-acceptor molecules containing either five (5T) or seven (7T) thiophene units end-capped with methyl dicyanovinyl (DCV) or ethyl cyanoacetate (CNA) electron-withdrawing groups was reported. Their thermal stability, phase behaviour, optical and electrochemical properties as well as photovoltaic performance in blends with IDIC or Y6 as acceptor materials were comprehensively investigated and compared. All of the obtained donor molecules are characterized by high thermal stability, efficient sunlight absorption and excellent solubility in combination with a good crystallinity. The results obtained allowed us to reveal the impact of the oligothiophene conjugation length and type of electron-withdrawing group on the properties and performance of the D-A oligothiophenes in NF OSC. The results clearly demonstrate that the devices based on donor molecules with 7T or CNA fragments significantly outperform those based on 5T or DCV groups.	Да (если в тексте публикации указано название ЦКП или УНУ)	8

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1	1А	2	3	4	5	6	7	8	9	10	11
9.	3129883	Статья в научном журнале	Effect of oligothiophene π -bridge length in D- π -A star-shaped small molecules on properties and photovoltaic performance in single-component and bulk-heterojunction organic solar cells and photodetectors	10.1016/j.mtener.2021.100863	Yu. N. Luponosov, A. N. Solodukhin, A. L. Mannanov, P. S. Savchenko, B. A. L. Raul и др.	Materials Today Energy, 22, 2021	2468-6069	ВАК; Ринц; Web of Science; Scopus	Donor-acceptor molecules with thiophene fragments as the π -bridge represent a promising class of materials for organic photovoltaics especially in single-component (SC) organic solar cells (OSCs) and other related applications. However, the effect of the oligothiophene π -bridge length on physicochemical properties, photophysics, charge transport, and photovoltaic performance of these materials has not been thoroughly addressed. Here, we report on the synthesis and comprehensive investigation of the series of star-shaped donor-acceptor molecules (0T-4T) with triphenylamine as a donor core linked through an oligothiophene π -bridge of variable length to the terminal hexyl-dicyanovinyl electron-withdrawing groups. We found that variation of the π -bridge length from 0 to 4 thiophene units strongly impacts their properties such as the solubility, highest occupied molecular orbital energy, optical absorption and photophysics, film morphology, phase behavior, and molecular packing as well as the charge carrier mobility. The performance of the SC and bulk heterojunction OSCs and photodetectors is comprehensively studied and compared. The results obtained provide insight into how to fine-tune and predict properties and photovoltaic performance of small molecules for organic solar cells and photodetectors.	Да (если в тексте публикации указано название ЦКП или УНУ)	10

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1	1A	2	3	4	5	6	7	8	9	10	11
10.	3129855	Статья в научном журнале	Electron deficient 5-hydroxy-1,2-dihydroisoquinolin-1-ones - A new class of fluorescent dyes with large Stokes shifts	10.1016/j.dyepig.2020.109107	A. Y. Belyy, D. N. Platonov, R. F. Salikov, K. P. Trainov, M. G. Medvedev и др.	Dyes and Pigments, 187, 2021	1873-3743	ВАК; Ринц; Web of Science; Scopus	A novel class of fluorescent electron-deficient 5-hydroxyisoquinolones is proposed. The new luminophores are obtained via the reaction of stable and easily available hepta(methoxycarbonyl)cycloheptatrienyl potassium with alkylamines, anilines and acylhydrazines. The new one-pot protocol is efficient with a large scope of primary amines. The solvolysis of N-acylamino substituted 5-hydroxyisoquinolones and subsequent reactions have provided a pathway to further functionalization. Nearly all compounds have demonstrated fluorescence with considerably large the Stokes shifts (up to 6169 cm ⁻¹) except for those containing a nitro group as well as O-substituted products. In most other cases neither quantum yield nor absorption and emission maxima nor the Stokes shifts substantially depended on the substituent at the isoquinolinone ring nitrogen atom.	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
11.	3129907	Статья в научном журнале	Electron deficient 5-hydroxy-1,2-dihydroisoquinolin-1-ones - A new class of fluorescent dyes with large Stokes shifts	10.1016/j.dyepig.2020.109107	A. Yu. Belyy, D. N. Platonov, R. F. Salikov, K. P. Trainov, M. G. Medvedev	Dyes and Pigments, 187, 2021	1873-3743	ВАК; Ринц; Web of Science; Scopus	A novel class of fluorescent electron-deficient 5-hydroxyisoquinolones is proposed. The new luminophores are obtained via the reaction of stable and easily available hepta(methoxycarbonyl)cycloheptatrienyl potassium with alkylamines, anilines and acylhydrazines. The new one-pot protocol is efficient with a large scope of primary amines. The solvolysis of N-acylamino substituted 5-hydroxyisoquinolones and subsequent reactions have provided a pathway to further functionalization. Nearly all compounds have demonstrated fluorescence with considerably large the Stokes shifts (up to 6169 cm ⁻¹) except for those containing a nitro group as well as O-substituted products. In most other cases neither quantum yield nor absorption and emission maxima nor the Stokes shifts substantially depended on the substituent at the isoquinolinone ring nitrogen atom.	Да (если в тексте публикации указано название ЦКП или УНУ)	9

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12.	3126082	Статья в научном журнале	Fully integrated ultra-sensitive electronic nose based on organic field-effect transistors	10.1038/s41598-021-88569-x	Anisimov, D.S., Chekusova, V.P., Trul, A.A., Abramov, A.A., Borshchev, O.V. и др.	Scientific Reports, 11 , 2021	2045-2322	ВАК; Ринц; Web of Science; Scopus	Modern solid-state gas sensors approaching ppb-level limit of detection open new perspectives for process control, environmental monitoring and exhaled breath analysis. Organic field-effect transistors (OFETs) are especially promising for gas sensing due to their outstanding sensitivities, low cost and small power consumption. However, they suffer of poor selectivity, requiring development of cross-selective arrays to distinguish analytes, and environmental instability, especially in humid air. Here we present the first fully integrated OFET-based electronic nose with the whole sensor array located on a single substrate. It features down to 30 ppb limit of detection provided by monolayer thick active layers and operates in air with up to 95% relative humidity. By means of principal component analysis, it is able to discriminate toxic air pollutants and monitor meat product freshness. The approach presented paves the way for developing affordable air sensing networks for the Internet of Things.	Да (если в тексте публикации указано название ЦКП или УНУ)	12
13.	3129910	Статья в научном журнале	Growth from Solutions, Structure, and Spectral-Luminescent Properties of Crystalline Films of Di-n-hexyl-para-quaterphenyl	10.1134/S1063774521060262	Postnikov V.A., Yurasik G.A., Kulishov A.A., Lyasnikova M.S., Borshchev O.V. и др.	Crystallography Reports, 66, 2021	1063-7745	ВАК; Ринц; Web of Science; Scopus	The results of studying the growth and structure of crystalline films of para-quaterphenyl derivative with terminal n-hexyl substituents—di-n-hexyl-para-quaterphenyl—are reported for the first time. The structure of crystalline films has been investigated using X-ray diffraction. It is found that crystalline films of di-n-hexyl-para-quaterphenyl, as well as crystals of unsubstituted para-quaterphenyl, are prone to outgrowth on a liquid–air interface in the form of a stack of parallel monomolecular layers with a thickness $d_{001} = 3.05$ nm. The optical absorption and photoluminescence spectra of solutions in n-hexane, toluene, and tetrahydrofurane, as well as crystalline samples, have been studied.	Да (если в тексте публикации указано название ЦКП или УНУ)	1131

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14.	3129906	Статья в научном журнале	Growth of p-Sexiphenyl Crystals and its Trimethylsilyl Derivative from the Vapor Phase.	10.1134/S1027451021010134	Postnikov V.A., Kulishov A.A., Borshchev O.V., Svidchenko E. A., Surin N. M.	Journal of Surface Investigation: X-ray, Synchrotron and Neutron Techniques, 15, 2021	1027-4510	ВАК; Ринц; Web of Science; Scopus	Large single-crystal films of p-sexiphenyl and its derivative with terminal trimethylsilyl substituents are grown under physical-vapor-transport conditions. The structure of the single-crystal films is studied by X-ray diffraction. In the crystals of the trimethylsilyl derivative there is a significant shift of molecular π systems relative to each other inside the (001) layers with "herringbone" packing in comparison with the crystal structure of p-sexiphenyl. The optical absorption and photoluminescence spectra of the studied substances in tetrahydrofuran solutions are obtained and analyzed. The presence of $-\text{Si}(\text{CH}_3)_3$ terminal substituents in the molecule is found to cause a slight bathochromic shift in the absorption and photoluminescence spectra of the solutions.	Да (если в тексте публикации указано название ЦКП или УНУ)	26

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1	1А	2	3	4	5	6	7	8	9	10	11
15.	3126147	Статья в научном журнале	Hybrid polycarbosilane-siloxane dendrimers: Synthesis and properties	10.3390/polym13040606	Milenin, S.A., Selezneva, E.V., , Tikhonov, P.A., , Vasil'ev, V.G., , Buzin, A.I., и др.	Polymers, 13, 2021	2073-4360	ВАК; Ринц; Web of Science; Scopus	A series of carbosilane dendrimers of the 4th, 6th, and 7th generations with a terminal trimethylsilylsiloxane layer was synthesized. Theoretical models of these dendrimers were developed, and equilibrium dendrimer conformations obtained via molecular dynamics simulations were in a good agreement with experimental small-angle X-ray scattering (SAXS) data demonstrating molecule monodispersity and an almost spherical shape. It was confirmed that the glass transition temperature is independent of the dendrimer generation, but is greatly affected by the chemical nature of the dendrimer terminal groups. A sharp increase in the zero-shear viscosity of dendrimer melts was found between the 5th and the 7th dendrimer generations, which was qualitatively identical to that previously reported for polycarbosilane dendrimers with butyl terminal groups. The viscoelastic properties of high-generation dendrimers seem to follow some general trends with an increase in the generation number, which are determined by the regular branching structure of dendrimers.	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
16.	3129844	Статья в научном журнале	Mechanochemical synthesis and structure of a nanocluster {organosilicon dendrimer-Copper dimer}	10.1016/j.jorganchem.2021.121976	Aleksandrov A., Shevchenko V., Tarasenko A., Surin N., Cherkaev G. и др.	Journal of Organometallic Chemistry, 950, 2021	0022-328X	ВАК; Ринц; Web of Science; Scopus	A novel nanocluster (organosilicon dendrimer - copper dimer) G1-8S-Dec•2CuCl ₂ was synthesized by a mechanochemical method. Optical and IR spectroscopy, NMR and ESR methods confirm that mechanochemical action on the mixture (dendrimer G1-8S-Dec + anhydrous copper (II) chloride) leads to the formation of a structure in which two copper atoms are linked by exchange interaction and are stabilized in the form of a dimer by sulfur atoms in the structure of the dendrimer G1-8S-Dec. A quantum mechanical calculation was carried out using the density differential method (DFT), which proved the possibility of the existence of two tetrahedral complexes SCuCl ₃ connected by a common face of chlorine atoms and having sulfur atoms at the vertices located in the branches of the dendrimer. The structure of the Cu ₂ Cl ₄ Si ₅ C ₁₁₆ H ₂₄₄ S ₈ nanocluster is calculated by complete geometry optimization. It was found that the synthesized cluster implements the Dzyaloshinsky - Moriya interaction and exhibits multiferroic properties.	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
17.	3126086	Статья в научном журнале	Mesoporous membrane materials based on ultra-high-molecular-weight polyethylene: From synthesis to applied aspects	10.3390/membranes11110834	Arzhakova, O.V., Nazarov, A.I., Solovei, A.R., Dolgova, A.A., Kopnov, A.Yu. и др.	Membranes, 11, 2021	2077-0375	ВАК; Ринц; Web of Science; Scopus	The development of new porous polymeric materials with nanoscale pore dimensions and controlled morphology presents a challenging problem of modern materials and membrane science, which should be based on scientifically justified approaches with the emphasis on ecological issues. This work offers a facile and sustainable strategy allowing preparation of porous nanostructured materials based on ultra-high-molecular-weight polyethylene (UHMWPE) via the mechanism of environmental intercrystallite crazing and their detailed characterization by diverse physicochemical methods, including SEM, TEM, AFM, liquid and gas permeability, DSC, etc. The resultant porous UHMWPE materials are characterized by high porosity (up to ~45%), pore interconnectivity, nanoscale pore dimensions (below 10 nm), high water vapor permeability [1700 g/(m ² × day)] and high gas permeability (the Gurley number ~300 s), selectivity, and good mechanical properties. The applied benefits of the advanced UHMWPE mesoporous materials as efficient membranes, breathable, waterproof, and insulating materials, light-weight materials with reduced density, gas capture and storage systems, porous substrates and scaffolds are discussed.	Да (если в тексте публикации указано название ЦКП или УНУ)	17

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1	1А	2	3	4	5	6	7	8	9	10	11
18.	3126096	Статья в научном журнале	Monitoring the curing processes of epoxy oligomers with partially substituted polyethoxymetallo siloxanes by IR spectroscopy and thermomechanical analysis	10.1002/apr.50918	Parshina, M.S., Tarasenkov, A.N., Aysin, R.R., Tebeneva, N.A., Buzin, M.I. и др.	Journal of Applied Polymer Science, 138, 2021	1097-4628	ВАК; Ринц; Web of Science; Scopus	In this work, the curing of «ED-20» epoxy resin with partially siloxy-substituted aluminum, iron, and zirconium siloxanes that we obtained previously was studied. The initial content of a metallosiloxane in the compositions was 5-50 wt% with respect to the resin. In all the cases, thermal curing was used to obtain a series of samples in the form of solid homogeneous materials. The fact of the epoxy ring opening in the resin was confirmed by IR spectroscopy. The catalytic properties of the metal atom in a metallosiloxane were found to affect the curing process. The samples demonstrate rather a high resistance to thermooxidative destruction, and in most cases, their glass transition temperatures are lower than those obtained upon standard curing of «ED-20» resin with triethylenetetramine. Partially siloxy-substituted metalloalkoxysiloxanes can be efficient agents for curing and formation of a hybrid material based on epoxy resins.	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
19.	3127115	Статья в научном журнале	Multiarm Star Polymers. Fundamental Aspects. A Review	10.1134/S001250082101002X	Tikhonov, P.A., , Vasilenko, N.G., , Muzafarov, A.M.	Doklady Chemistry, 496 (1), 2021	0012-5008	ВАК; Ринц; Web of Science; Scopus	The review is devoted to the analysis of the currently available data in the field of the molecular organization of multiarm stars, macromolecules-particles characterized by the dualism of macromolecular and colloidal properties. Until now, the question of the predominance of polymeric or colloidal behavior for such objects remains open. The distinctive properties of multiarm stars—very low intrinsic viscosity and the formation of monomolecular micelles—are determined by the peculiarities of their molecular organization. The appearance of dendrimers as the initial branching centers made it possible to create a representative number of objects, and this allowed one to study the property-structure relationship for this group of objects at a new qualitative level. The results obtained are important for studying the factors that determine the “anomalous” behavior of macromolecules-particles, such as dendrimers, nanogels, and dense molecular brushes, and provide an important experimental basis for theoretical understanding of the behavior of these objects as a function of their structure.	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
20.	3126143	Статья в научном журнале	Multiarm star-shaped polydimethylsiloxanes with a dendritic branching center	10.3390/molecules26113280	Tikhonov, P.A., Vasilenko, N.G., , Gallyamov, M.O., , Cherkaev, G.V., , Vasil'ev, V.G., и др.	Molecules, 26, 2021	1420-3049	BAK; Ринц; Web of Science; Scopus	New multiarm stars have been synthesized based on polyolithium derivatives of high-generation carbosilane dendrimers. In the synthesis of multiarm stars based on the eighth-generation dendrimer, steric hindrances were observed even during the synthesis of a polyolithium initiator. Subsequently, this led to chain transfer reactions between growing arms, as well as other side effects. As a result, dense nanogel formations with a higher tendency of ordering than in classical objects of this type were isolated from the reaction mixture. The study of the rheology of multiarm stars based on sixth-generation dendrimers made it possible to determine the activation energies of viscous flow in these objects, which makes it possible to consider them as objects with a macromolecular nature and a reptation flow mechanism.	Да (если в тексте публикации указано название ЦКП или УНУ)	13
21.	3126131	Статья в научном журнале	New principles of polymer composite preparation. Mq copolymers as an active molecular filler for polydimethylsiloxane rubbers	10.3390/polym13172848	Meshkov, I.B., Kalinina, A.A., , Gorodov, V.V., , Bakirov, A.V., , Krashennnikov, S.V., и др.	Polymers, 13, 2021	2073-4360	BAK; Ринц; Web of Science; Scopus	Colorless transparent vulcanizates of silicone elastomers were prepared by mixing the components in a common solvent followed by solvent removal. We studied the correlation between the mechanical behavior of polydimethylsiloxane (PDMS)-rubber compositions prepared using MQ (mono-(M) and tetra-(Q) functional siloxane) copolymers with different ratios of M and Q parts as a molecular filler. The composition and molecular structure of the original rubber, MQ copolymers, and carboxyl-containing PDMS oligomers were also investigated. The simplicity of the preparation of the compositions, high strength and elongation at break, and their variability within a wide range allows us to consider silicone elastomers as a promising alternative to silicone materials prepared by traditional methods.	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
22.	3126145	Статья в научном журнале	New sparse polymethylsiloxane dendrimers	10.1016/j.mencom.2021.04.037	Katarzhnova, E.Y., Tatarinova, E.A., , Ignat'eva, G.M., , Vasilenko, N.G., , Meshkov, I.B., и др.	Mendelev Communications, 31, 2021	1364551X	ВАК; Ринц; Web of Science; Scopus	New non-functional methylsiloxane dendrimers possessing a sparse structure with a trimethylsiloxy outer layer containing a flexible dimethylsiloxane link between branch points have been synthesized. Two alternative synthetic protocols were employed, namely, a divergent scheme comprising an additional stage of generating a spacer -OSiMe ₂ -group with sodium ethoxy(dimethyl)silanolate, and a hybrid method using monofunctional dendrons with a sparse structure.	Да (если в тексте публикации указано название ЦКП или УНУ)	395

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1	1А	2	3	4	5	6	7	8	9	10	11
23.	3126134	Статья в научном журнале	Non-accumulative in the environment facile hydrophobic coatings based on branched siloxanes with perfluoroalkyl substituents	10.1016/j.jorganchem.2021.121910	Shkinev, P., , Evdokimova, A., , Drozdov, F.V., , Gervits, L.L., Muzafarov, A.M.	Journal of Organometallic Chemistry, 948, 2021	0022-328X	ВАК; Ринц; Web of Science; Scopus	Based on triethoxy(3-(1,1,1,2,5,5,5-heptafluoro3-(perfluoropropan-2-yl)-4-(trifluoromethyl)pent-3-en-2-yl)oxy)propylsilane, obtained from the commercially available trimer hexafluoropropylene, branched oligosiloxanes were synthesized by hydrolytic polycondensation in the active medium. The resulting polymers were studied by NMR and IR spectroscopy, and their molecular mass characteristics were investigated by GPC. In order to create stable hydrophobic coatings, the dependence of the hydrophobic properties of the resulting coatings on the surface of glass and aluminum on the conditions of polymer synthesis was studied. It has been shown that changes in the nature of the active medium (acetic or trifluoroacetic acid), the synthesis temperature, and the ratio of monomers:the active medium results in a polymer with similar molecular weights. For polymer coatings with the highest molecular weight $M_w = 21.6 \times 10^3$, the average values of contact angles on glass and aluminum were 113 and 114°, respectively. In addition, condensation of the triethoxyl derivative of the hexafluoropropylene trimer with phenyltrimethoxysilane produced a modifier for hydrophobizing the surface of epoxy resins. When mixed into an epoxy resin up to 1.5% by weight of the resulting copolymer, resins with a contact angle of up to 113° were obtained.	Да (если в тексте публикации указано название ЦКП или УНУ)	5

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1	1А	2	3	4	5	6	7	8	9	10	11
24.	3129914	Статья в научном журнале	Novel Polyetherimides Based on 5-Methyl-1,3-phenylene-bis-4-oxypthalic Acid Dianhydride: Synthesis and Physicochemical Properties	10.1134/S1560090422010031	A. M. Orlova, A. Yu. Tsegelskaya, T. I. Kolesnikov, I. G. Abramov, A. A. Kuznetsov и др.	Polymer Science, Series B, -, 2021	1560-0904	ВАК; Ринц; Web of Science; Scopus	A novel monomer for the synthesis of polyimides, 5-methyl-1,3-phenylene-bis-4-oxypthalic acid dianhydride was developed. The synthesis was carried out in three stages: the reaction of nucleophilic nitro substitution of 4-nitrophthalonitrile with 5-methylresorcinol (orcinol) potassium salt and subsequent hydrolysis of the nitrile groups have afforded 5-methyl-1,3-phenylene-bis-4-oxypthalic acid, dehydration of which has given the corresponding dianhydride. A series of new thermoplastic high molecular weight polyetherimides based on 5-methyl-1,3-phenylene-bis-4-oxypthalic acid dianhydride and several aromatic diamines of various structures were synthesized by the method of one-stage catalytic polycondensation in a benzoic acid melt. Inherent viscosity and weight-average molecular mass of the polyetherimides have been of 0.28–1.20 dL/g and (33–114) × 10 ³ , respectively. The polyetherimides have been soluble in chloroform, THF, DMF, DMAA, N-methylpyrrolidone, and DMSO and have revealed film-forming properties. According to the DSC and wide-angle X-ray scattering data, the polyetherimides have been found completely amorphous, the glass transition temperature being in the 185–307°C range.	Да (если в тексте публикации указано название ЦКП или УНУ)	8

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1	1А	2	3	4	5	6	7	8	9	10	11
25.	3126144	Статья в научном журнале	Pixelated full-colour small molecule semiconductor devices towards artificial retinas	10.1039/d0tc05383j	Skhunov, M., , Solodukhin, A.N., Giannakou, P., , Askew, L., , Luponosov, Y.N., и др	Journal of Materials Chemistry C, 9, 2021	2050-7534	ВАК; Ринц; Web of Science; Scopus	Opto-stimulation of semiconductor-biointerfaces provides efficient pathways towards eliciting neural activity through selective spectral excitation. In visual prosthesis, tri-colour stimulation capability is the key to restoring full-colour vision. Here we report on investigation of organic photoactive π -conjugated donor-acceptor small molecules based on triphenylamine whose absorption spectra are similar to those of the photoreceptors of the human eye. Photoactive device fabrication and characterisation towards full colour, pixelated retinal prosthesis based on inkjet printing of these molecules is demonstrated, with round pixels reaching 25 microns in diameter. Photo-response is studied via interfacing with biological electrolyte solution and using long-pulse, narrow-band excitation. Both photo-voltage and photo-current responses in the devices with a ZnO hole-blocking interlayer show clear signatures of capacitive charging at the electrolyte/device interface, also demonstrating spectral selectivity comparable to that of human eye' cones and rods.	Да (если в тексте публикации указано название ЦКП или УНУ)	5865

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1	1А	2	3	4	5	6	7	8	9	10	11
26.	3126128	Статья в научном журнале	Polysaccharides as stabilizers for polymeric microcarriers fabrication	10.3390/polym13183045	Demina, T.S., Kilyashova, L.A., Popyrina, T.N., Svidchenko, E.A., Bhuniya, S. и др.	Polymers, 13, 2021	2073-4360	ВАК; Ринц; Web of Science; Scopus	Biodegradable polymeric microparticles are widely used in drug delivery systems with prolonged-release profiles and/or cell microcarriers. Their fabrication via the oil/water emulsion solvent evaporation technique has normally required emulsifiers in the aqueous phase. The present work aims to evaluate the effectiveness of various polysaccharides, such as chitosan, hyaluronic acid, cellulose, arabinogalactan, guar and their derivatives, as an alternative to synthetic surfactants for polylactide microparticle stabilization during their fabrication. Targeted modification of the biopolymer's chemical structure was also tested as a tool to enhance polysaccharides' emulsifying ability. The transformation of biomacromolecules into a form of nanoparticle via bottom-up or top-down methods and their subsequent application for microparticle fabrication via the Pickering emulsion solvent evaporation technique was useful as a one-step approach towards the preparation of core/shell microparticles. The effect of polysaccharides' chemical structure and the form of their application on the polylactide microparticles' total yield, size distribution and morphology was evaluated. The application of polysaccharides has great potential in terms of the development of green chemistry and the biocompatibility of the formed microparticles, which is especially important in biomedicine application	Да (если в тексте публикации указано название ЦКП или УНУ)	8

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1	1А	2	3	4	5	6	7	8	9	10	11
27.	3126149	Статья в научном журнале	Pulse Programming of Resistive States of a Benzothieno[3,2-B][1]-Benzothiophene-Based Organic Memristive Device with High Endurance	10.1002/psr.202100471	Prudnikov, N.V., , Malakhova, Y.N., , Emelyanov, A.V., , Borshchev, O.V., , Skorotetcky, M.S. и др.	Physica Status Solidi - Rapid Research Letters, 0, 2021	1862-6254	ВАК; Ринц; Web of Science; Scopus	Organic memristive devices are promising elements to be used in memory tasks, neuromorphic systems, and bioelectronics as hardware analogs of synapses. Among other materials, small molecules are considered in this field as candidates with more adjustable properties and fine chemical structures. Herein, the first organic memristive device based on benzothieno[3,2-b][1]-benzothiophene (BTBT) siloxane dimer is reported. The device resistance programming by voltage pulses with various control parameters is demonstrated: amplitude, frequency, and pulse duty cycle. It is proved that the device has at least four different resistive states in each case. In addition, the device shows 2.5×10^4 cycles of sustainable operation in the endurance test with ROFF/RON ratio exceeding 5.	Да (если в тексте публикации указано название ЦКП или УНУ)	7

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1	1А	2	3	4	5	6	7	8	9	10	11
28.	3126142	Статья в научном журнале	Regulating Tissue-Mimetic Mechanical Properties of Bottlebrush Elastomers by Magnetic Field	10.1021/ac-sami.1c12860	Kostrov, S.A., , Dashtimoghdam, E., Keith, A.N., Sheiko, S.S., Kramarenko, E.Y.	ACS Applied Materials and Interfaces, 13 , 2021	1944-8244	ВАК; Ринц; Web of Science; Scopus	We report on a new class of magnetoactive elastomers (MAEs) based on bottlebrush polymer networks filled with carbonyl iron microparticles. By synergistically combining solvent-free, yet supersoft polymer matrices, with magnetic microparticles, we enable the design of composites that not only mimic the mechanical behavior of various biological tissues but also permit contactless regulation of this behavior by external magnetic fields. While the bottlebrush architecture allows to finely tune the matrix elastic modulus and strain-stiffening, the magnetically aligned microparticles generate a 3-order increase in shear modulus accompanied by a switch from a viscoelastic to elastic regime as evidenced by a ca. 10-fold drop of the damping factor. The developed method for MAE preparation through solvent-free coinjection of bottlebrush melts and magnetic particles provides additional advantages such as injection molding of various shapes and uniform particle distribution within MAE composites. The synergistic combination of bottlebrush network architecture and magnetically responsive microparticles empowers new opportunities in the design of actuators and active vibration insulation systems.	Да (если в тексте публикации указано название ЦКП или УНУ)	8

№ 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	1A	2	3	4	5	6	7	8	9	10	11
29.	3126141	Статья в научном журнале	Simple synthesis of alkyl derivatives of tetrathienoacene and their application in organic field-effect transistors	10.1039/d1tc01469b	Skorotetcky, M.S., Borshchev, O.V., , Polinskaya, M.S., , Zaborin, E.A., , Chekusova, V.P., и др.	Journal of Materials Chemistry C, 9, 2021	2050-7534	BAK; Ринц; Web of Science; Scopus	Friedel-Crafts acylation of tetrathienoacene (TTA) followed by a reduction reaction resulting in various octyl-substituted TTA derivatives is described for the first time. Varying conditions of the acylation reaction allowed control over the formation of mono- or diketones, which were further reduced to mono- or dialkyls. It was shown that an alkyl group can be introduced either in α , β , or both positions of TTA in a controllable way. Optical, thermal, electrochemical and semiconducting properties of the mono and dioctyl substituted derivatives of TTA are presented. Small and wide-angle diffraction investigations made it possible to attribute the P2 monoclinic crystal structure for C8-TTA-C8 and mesophase existence for C8-TTA at room temperature. Top-contact bottom gate OFETs with a C8-TTA-C8 active layer fabricated by vacuum deposition or solution processing showed similar characteristics pointing out its good processability.	Да (если в тексте публикации указано название ЦКП или УНУ)	10220

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1	1А	2	3	4	5	6	7	8	9	10	11
30.	3126150	Статья в научном журнале	Synthesis and characterization of polyacrylonitrile-grafted copolymers based on poly(Vinylidene fluoride)	10.3144/expresspoly.mlett.2021.77	Khudyshkina, A.D., , Luponosov, Yu.N., , Shevchenko, V.G., , Ponomarenko, S.A.	Express Polymer Letters, 15(10), 2021	1788-618X	ВАК; Ринц; Web of Science; Scopus	t. Grafted poly(vinylidene fluoride) (PVDF)-based copolymers attract great attention due to their tunable ferroelectric and dielectric characteristics, which gives great perspectives for electronic applications. In this work, two strategies for polyacrylonitrile-grafted PVDF-based copolymers synthesis, namely single electron transfer radical polymerization (SET-LRP) and photoinduced Cu(II)-mediated reversible deactivation radical polymerization (RDRP) were investigated, their advantages and shortcomings are discussed. Using these methods two series of poly(vinylidene fluoride-co-chlorotrifluoroethylene)- grafted-polyacrylonitrile p(VDF-co-CTFE)-g-PAN and poly(vinylidene fluoride-co-trifluoroethylene-co-chlorotrifluoroethylene)-grafted-polyacrylonitrile p(VDF-co-TrFE-co-CTFE)-g-PAN with different PAN content were prepared. Important characteristics of the grafted PVDF-based copolymers such as phase behavior, thermal stability, and dielectric properties were investigated, and impacts of the macromolecular backbone type, as well as the content of grafted PAN on these properties, are discussed. It was shown that PAN incorporation leads to significant dielectric properties change since the dielectric permittivity of PAN-grafted copolymers is twice higher in comparison to the pristine copolymers. The crucial impact of PAN grafting onto PVDF-based copolymers backbone on their phase, thermal and dielectric behavior is demonstrated.	Да (если в тексте публикации указано название ЦКП или УНУ)	968

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1	1А	2	3	4	5	6	7	8	9	10	11
31.	3126121	Статья в научном журнале	Synthesis of polymethylsiloxane molecular brushes	10.1016/j.mencom.2021.09.037	Obrezkova, M.A., Saraeva, I.I., Ignat'eva, G.M., Vasilenko, N.G., Muzafarov, A.M.	Mendelev Communications, 31, 2021	1364551X	ВАК; Ринц; Web of Science; Scopus	Dense purely methylsiloxane molecular brushes with high molecular masses were obtained by the 'grafting to' method. Vinyl groups of poly(vinyldimethylsiloxo)methylsiloxane were converted into (chlorodimethylsilyl)ethyl ones whose active chlorine atoms were replaced by monofunctional dimethylsiloxane oligomers having OLi terminal group to arrange side arms of the product. The molecular brushes thus prepared were characterized using physicochemical methods of analysis.	Да (если в тексте публикации указано название ЦКП или УНУ)	705
32.	3126148	Статья в научном журнале	Synthesis, characterization and organic field-effect transistors applications of novel tetrathienoacene derivatives	10.1016/j.dyepig.2020.108911	Borshchev, O.V., Skorotetcky, M.S., Trukhanov, V.A., Fedorenko, R.S., Surin, N.M., и др.	Dyes and Pigments, 185, 2021	0143-7208	ВАК; Ринц; Web of Science; Scopus	Two novel organic semiconductors with tetrathienoacene (TTA) as the central core end-capped with 5-hexyl-2-thiophene, (Hex-T)2-TTA, and 4-hexyl-phenyl, (Hex-Ph)2-TTA, have been synthesized and investigated for organic field effect transistor (OFET) applications. The novel TTA derivatives were characterized by thermal gravimetric analysis, differential scanning calorimetry, UV-Vis spectroscopy, and cyclic voltammetry as well as studied by density functional theory calculations. Two types of OFETs with the solution and vacuum-deposited active layer were fabricated and characterized. Both TTA-derivatives demonstrated electroluminescence in OFETs, and (Hex-Ph)2-TTA showed ambipolar charge transport with the hole mobility as high as 0.68 cm ² V ⁻¹ s ⁻¹ .	Да (если в тексте публикации указано название ЦКП или УНУ)	7

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