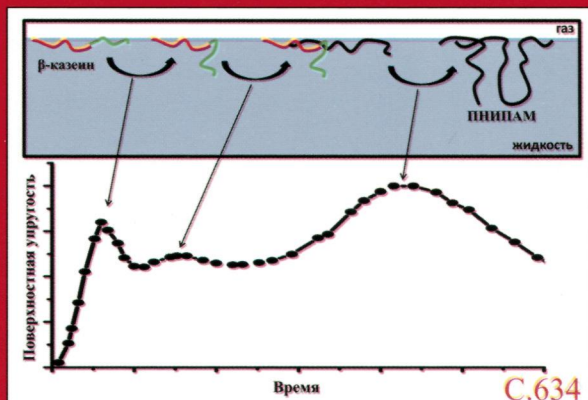
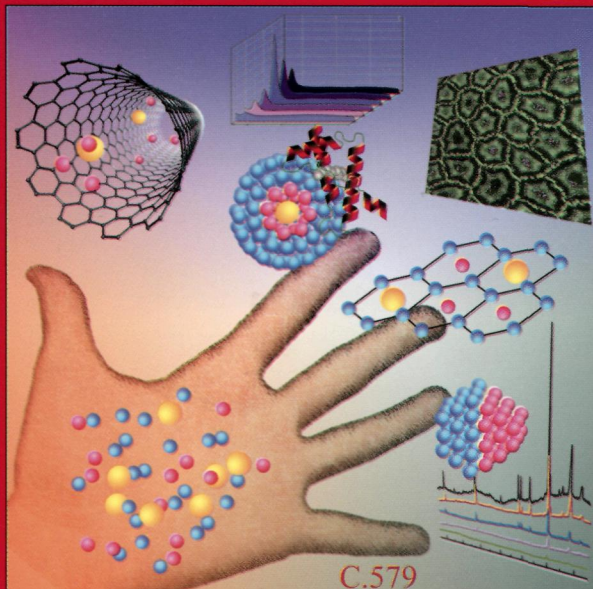
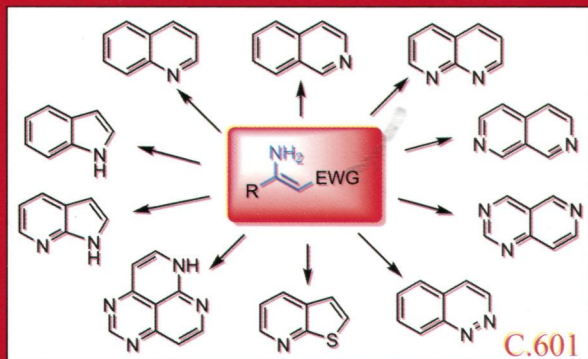
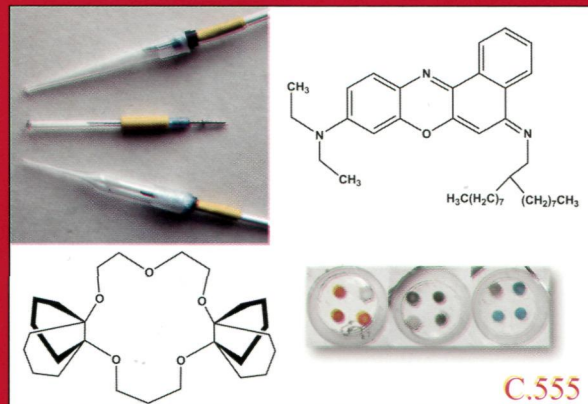
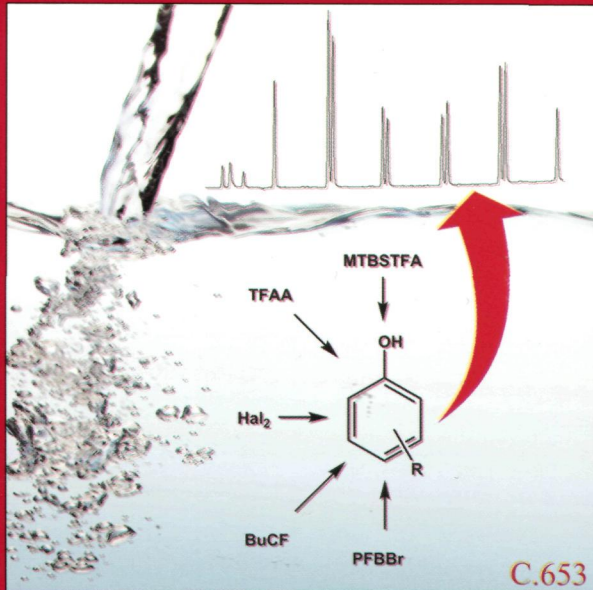


# Успехи ХИМИИ



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### Ionophore-based chemical sensors: advances and prospects

555

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The recent advances in the theory and practice of potentiometric, conductometric and optical sensors based on ionophores are critically reviewed. The role of heterogeneity of the sensor-sample systems is emphasized and it is shown that due to this heterogeneity, such sensors respond to the analyte activities rather than concentrations. The basics of the origin of the response of all three types of ionophore-based sensors are briefly described. Using literature sources published mainly from 2012 to 2014, the applications of novel sensor materials, novel preparation techniques and applications of sensors and advances in the theoretical interpretation of the sensor response are analyzed. Whenever necessary, the basic achievements made in the past are also addressed for better understanding of the trends in the field of ionophore-based sensors.

Bibliography – 295 references.

### Hybrid nanostructures: synthesis, morphology and functional properties

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Hybrid nanostructures representing combinations of various materials and possessing properties that are absent in separate components forming the hybrid are discussed. Particular attention is devoted to hybrid structures containing plasmon and magnetic nanoparticles, methods of their synthesis and the relationship of the composition, structure and properties. The functional features of the hybrid nanomaterials of various morphology (with core-shell structures, with embedded metal nanoparticles and with metal nanoparticles on the surface) are considered. The unique properties of these hybrid materials are demonstrated, which are of interest for solving problems of catalysis and photocatalysis, detecting impurities in various media, in vivo visualization, bioanalysis, as well as for the design of optical labels and multifunctional diagnostic nanoplatforms.

Bibliography – 182 references.

### Push-pull enamines in the synthesis of fused azaheterocycles

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Published data on the synthesis of various fused nitrogen-containing heterocycles *via* push-pull enamines (mainly enamionones) are analyzed. Both intermolecular (cyclocondensations) and intramolecular (cyclizations) transformations of enamines in which both nucleophilic centres of enamine (carbon and nitrogen) are incorporated into the resulting heterocycle are considered. The presented data on the reactivity of enamines cover a broad range of convenient methods for the preparation of diverse fused pyridines (quinolines, isoquinolines, pyridopyridines, *etc.*) and pyrroles (indoles, tetrahydrocarbazoles, pyrrolopyridines, *etc.*).

Bibliography — 191 references.

B.A.Noskov, A.G.Bykov

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The principal investigation results obtained in the last 15 years in the dilatational rheology of adsorption films of high-molecular-mass compounds at liquid/gas interfaces are analyzed. The theoretical grounds of the surface rheology methods and their applications to solutions of amphiphilic non-ionic polymers, polyelectrolytes, proteins and complexes of these substances with low-molecular-mass surfactants are considered. The interest in the dilatational surface rheology is caused, first of all, by the limited scope of existing experimental methods for investigation of liquid surfaces and by the fact that traditional techniques for the measurement of surface tension widely used to study solutions of low-molecular-mass surfactants give only limited information for polymer solutions due to very slow establishment of the equilibrium and slight dependence of the surface tension on the polymer concentration. It is noted that development of the surface rheology is stimulated by modern investigations of foams and emulsions, which have served to demonstrate the crucial role of dilatational surface rheological properties in the dynamics of liquid-phase dispersion systems.

Bibliography — 191 references.

**Derivatization in the gas chromatographic determination of phenol and aniline traces in aqueous media**I.V.Gruzdev,<sup>a</sup> I.G.Zenkevich,<sup>b</sup> B.M.Kondratenok<sup>a</sup><sup>a</sup>*Institute of Biology, Komi Scientific Centre, Ural Branch of Russian Academy of Sciences, Syktyvkar, Russia*<sup>b</sup>*Institute of Chemistry, Saint Petersburg State University, Russia*

Substituted phenols and anilines are the most widely encountered hydrophilic organic eco-toxicants. The principles of gas chromatographic determination of traces of these compounds in aqueous media at the concentration level of  $\leq 0.1 \text{ mg litre}^{-1}$  based on derivatization of the compounds, in particular, directly in the aqueous phase, are considered. Owing to the transformation of relatively hydrophilic analytes into hydrophobic derivatives, it is possible to achieve the indicated detection limits and to optimize the extraction preconcentration and selective chromatographic detection procedures. The advantages of electrophilic halogenation of phenols and anilines into the aromatic moieties over other derivatization processes are noted.

Bibliography — 177 references.