



*Российская
академия наук*

ISSN 0042-1308

Успехи химии

Обзорный журнал по химии

Том 85

Номер 2 2016

стр. 99 – 203

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The creation of new erythropoiesis-stimulating agents to be used in clinical practice requires constant development of methods of identifying abuse of these substances, which are prohibited in accordance with the World Anti-Doping Code and included in the World Anti-Doping Agency prohibited list. This review integrates and describes systematically the published data on the key methods currently used by anti-doping laboratories of the world to identify the erythropoiesis-stimulating agent abuse, including direct methods (various procedures of polyacrylamide gel electrophoresis, enzyme-linked immunosorbent assay, membrane immunoassay and mass spectrometry) and indirect methods (athlete biological passport). Primary attention is given to promising approaches and studies that can be used to control the prohibited erythropoietins in the near future.

Bibliography — 122 references.

From carbon nanostructures to high-performance sorbents for chromatographic separation and pre-concentration 115

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Published data on the carbon nanostructures such as fullerenes, nanotubes, graphene, nanodiamond and nanocarbon used to produce effective sorbents for recovery of organic compounds and heavy metal ions from aqueous solutions are analyzed and integrated. The achievements in the field of synthesis of hybrid carbon nanostructures and the possibilities of surface modification for performing rapid sorption pre-concentration are considered. The prospects of application of the indicated materials in sorption technologies and in analytical chemistry are discussed.

Bibliography — 364 references.

Microchannel systems for fine organic synthesis 139

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Characteristic features of application of microchannel systems in organic synthesis are analyzed. The advantages of such systems over conventional chemical engineering, especially for small-scale processes that require fast industrial implementation to obtain small quantities of the product, are shown. Particular examples of successful use of microchannel reactors for various types of organic synthesis are given, primary attention being devoted to the design features of microchannel reactors.

Bibliography — 118 references.

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The main approaches to stabilization of polymers and requirements to anti-ageing agents are discussed. Particular attention is devoted to the progress in the studies of the stabilizing activity of various substances in polyolefin- and polyvinyl chloride-based compositions. Particular demand for environmentally benign organic thermal stabilizers and antioxidants is noted. The so-called mesogenic structures serving as effective light and thermal stabilizers for polymer compositions are presented. The effects of mesogens on the supramolecular structure of polyethylene, deformation and relaxation properties and thermal parameters of polymer materials as well as flow-behaviour index and tribological properties are discussed.

Bibliography - 112 references.

Halo derivatives of benzo- and dibenzocrown ethers: preparation, structure, properties and applications

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The review summarizes the preparation methods of halo derivatives of benzo- and dibenzocrown ethers: halogenation of benzo- and dibenzocrown ethers with molecular halogens, *N*-halosuccinimides in the solid phase and in solvents (water, ethanol, halohydrocarbons) and hypohalites in water and the assembly method. Reactions involving the title compounds are considered, in particular, preparation of phosphorus-containing crown ethers, metal-organic synthesis, Heck and Sonogashira reactions, synthesis of acetylene derivatives and other transformations. Particular attention is paid to the complexing properties of halobenzocrown ethers towards ionic guests and neutral organic molecules. The possibility to prepare complexes of these compounds in the solid phase is demonstrated. The extraction and sorption properties of halogenated benzo- and dibenzocrown ethers are considered. Examples of their practical application are given.

Bibliography — 203 references.