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Russian Chemical Reviews

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Heterogeneous photocatalysts in organic synthesis 183

M.Cherevatskaya, B.König

Faculty of Chemistry and Pharmacy, University of Regensburg, Germany

The review is devoted to the application of inorganic semiconductors as heterogeneous photocatalysts in organic synthesis. Although these materials have been mainly used for decomposition of organic compounds, the number of examples of synthetic applications is constantly growing. The mechanisms of heterogeneous semiconductor photocatalysis is considered and examples demonstrating the use of inorganic semiconductors in organic synthesis are given. The discussion is arranged by the wavelength absorbed by the catalyst (UV or visible light) and by the nature of the new bond formed (carbon-carbon or carbon-heteroatom bonds). Bibliography — 47 references.

Optical methods in the detection of heavy metal ions 196

A.N.Uglov, A.Bessmertnykh-Lemeune, R.Guilard, A.D.Averin, I.P.Beletskaya

Institut de Chimie Moléculaire, Université de Bourgogne, France

Department of Chemistry, M.V.Lomonosov Moscow State University, Russia

The review covers an important area of the modern chemistry, namely, detection of heavy metal ions using optical molecular detectors. The role of this method in metal ion detection and physicochemical grounds of operation of chemosensors are discussed, and examples of detection of most abundant heavy metal ions and synthetic approaches to molecular detectors are presented. The immobilization of molecular detectors on solid substrates for the design of analytical sensor devices is described. Bibliography — 178 references.

Sulfur monochloride in organic synthesis 225

L.S.Konstantinova, O.A.Rakitin

N.D.Zelinsky Institute of Organic Chemistry, Russian Academy of Sciences, Moscow, Russia

Data on the reactivity of sulfur monochloride published during the last 15 years are summarized and described systematically. Primary attention is devoted to the synthesis of acyclic and heterocyclic compounds involving S_2Cl_2 . Bibliography — 154 references.

Novel graphene-based nanostructures: physicochemical properties and applications 251

L.A.Chernozatonskii, P.B.Sorokin, A.A.Artukh

N.M.Emanuel Institute of Biochemical Physics, Russian Academy of Sciences, Moscow, Russia

Technological Institute for Superhard and Novel Carbon Materials, Moscow, Troitsk, Russia

The review concerns graphene-based nanostructures including graphene ribbons a few nanometres wide, structures functionalized with hydrogen and fluorine atoms as well as purely carbon composites. The physicochemical properties of the systems in question and the chemical technological methods for their fabrication are considered. Methods for solving problems in modern nanotechnology are discussed. Possible applications of graphene and graphene-based nanostructures in various devices are outlined. Bibliography — 285 references.