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## Содержание

- |   |            |  |
|---|------------|--|
| <b>Н.С.Кожевникова,<br/>А.С.Ворох,<br/>А.А.Урицкая</b>  | <b>225</b> | Наночастицы сульфида кадмия, полученные методом химического осаждения из растворов                                     |
| <b>О.А.Иноземцева,<br/>Ю.Е.Сальковский,<br/>А.Н.Северюхина,<br/>И.В.Видяшева,<br/>Н.В.Петрова,<br/>Х.А.Метвалли,<br/>И.Ю.Стецюра,<br/>Д.А.Горин</b> | <b>251</b> | Электроформование функциональных материалов для биомедицины и тканевой инженерии                                       |
| <b>Г.М.Мамардашвили,<br/>Н.Ж.Мамардашвили,<br/>О.И.Койфман</b>  | <b>275</b> | Синтез и рецепторные свойства каликс[4]пирролов  |
| <b>К.Н.Гусак,<br/>Ж.В.Игнатович,<br/>Е.В.Королева</b>   | <b>288</b> | Новые возможности реакции восстановительного алкилирования аминов  |
| <b>А.В.Пестов,<br/>П.А.Слепухин,<br/>В.Н.Чарушин</b>  | <b>310</b> | Хелатные комплексы меди и никеля с полидентатными N,O-лигандами: строение и магнитные свойства многоядерных комплексов |

## Contents

**Cadmium sulfide nanoparticles obtained by chemical bath deposition** 225

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The key results of recent studies devoted to cadmium sulfide nanoparticles are described systematically. Data on the dependence of structure and properties of CdS nanoparticles on their size are presented. The possibilities of using CdS quantum dots as biolabels and sensitizers for solar cells are analyzed. The principles, details and the scope of chemical bath deposition from aqueous solutions for the production of CdS nanocrystals and hybrid forms based on them with specified structure and properties are described. Bibliography - 180 references.

**Electroforming of functional materials for biomedicine and for tissue engineering** 251

O.A.Inozemtseva,<sup>a</sup> Y.E.Salkovskiy,<sup>a</sup> A.N.Severyukhina,<sup>a</sup> I.V.Vidyasheva,<sup>a</sup> N.V.Petrova,<sup>a</sup>  
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The published data on nanostructured materials produced by electroforming are analyzed and generalized. Primary attention is devoted to the manufacture and properties of nanocomposite fibrous materials and functionalization and modification methods of the fibre surface. The prospects for the use of nonwoven fabric in biotissue engineering and for the production of smart materials are considered. Bibliography — 330 references.

**Synthesis and receptor properties of calix[4]pyrroles** 275

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Published data on the synthesis and complexation of calix[4]pyrroles with anions, ion pairs and neutral molecules of various nature are analyzed, summarized and described systematically. Methods for the synthesis of the initial macrocycles and their functionalization pathways are presented. The key principles, mechanisms and driving forces of formation of calix[4]pyrrole-based supramolecular complexes are considered. Primary attention is given to the factors that provide efficient control over the formation of these structures. Bibliography — 79 references.

**New potential of the reductive alkylation of amines** 288

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The data on reductive alkylation of amines with carbonyl compounds — a key method for the preparation of secondary and tertiary amines — are described systematically. The information on the reducing agents and catalysts used and the use of chiral catalysts in stereo- and enantio-controlled reactions of amine synthesis is given. The influence of the reactant and catalyst structures on the rate, chemoselectivity and stereo(enantio)selectivity of the reactions is considered. Bibliography — 156 references.

**Copper and nickel chelate complexes with polydentate N,O-ligands: structure and magnetic properties of polynuclear complexes**

310

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Comparative analysis of the structures of copper(II) and nickel(II) chelate complexes with N-substituted 2-aminoethanol, 3-aminopropan-1-ol, glycine and  $\beta$ -alanine is performed. It is shown that tetradentate ligands based on 3-aminopropan-1-ol and  $\beta$ -alanine, sterically hindered 2-aminoethanol derivatives and tridentate enamino ketone derivatives tend to form oligonuclear copper(II) and nickel(II) complexes. Glycine derivatives do not provide the formation of oligonuclear copper(II) and nickel(II) complexes. The magnetic properties of a number of polynuclear complexes are compared.

Bibliography — 182 references.