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Structure and function analysis of protein–nucleic acids complexes 445

S.A.Kuznetsova, T.S.Oretskaya

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The review considers published data on the results and achievements in the field of structure and function analysis of protein–nucleic acid complexes by means of physical and biochemical methods including X-ray diffraction, nuclear magnetic resonance spectroscopy, electron and atomic force microscopy, small angle X-ray and neutron scattering, footprinting and cross-linking. Special attention is given to the use of combined approaches. The advantages and limitations of each method are described, as well as the perspectives for their use in wide-scale structural studies *in vivo*. Bibliography — 146 references.

Inorganic pyrophosphatases: structure diversity serving the function 464

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The review is devoted to ubiquitous enzymes, inorganic pyrophosphatases, which are essential in all living organisms. Despite the impressive history of investigations, the interest in these enzymes persists. This review focuses on three-dimensional structures of various representatives of this class of proteins. The structure diversity and the relationship between the structure and some properties of pyrophosphatases and various mechanisms of action implemented owing to the structure diversity of these enzymes are discussed. Some sections consider pyrophosphatase interaction with other proteins and possible practical applications. Bibliography — 56 references.

Synthesis, properties and self-assembly of meso-arylporphyrins with higher alkyl substituents 477

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The review summarizes published data on the methods for preparation of *meso*-arylporphyrins with higher alkyl substituents. The methods for creation of self-assembling nanostructures based on these compounds and the data on their applications are presented. Approaches to the synthesis of functionalized lipophilic and amphiphilic *meso*-arylporphyrins are discussed. The ways and driving forces for the formation of supramolecular porphyrin assemblies in solutions and on the substrate surface are considered. The prospects of using alkyl porphyrin derivatives for the design of nanomaterials are shown. Bibliography — 204 references.

E.V.Dmitrienko,^{a, b} I.A.Pyshnaya,^a O.N.Martyanov,^c D.V.Pyshnyi^a^a *Institute of Chemical Biology and Fundamental Medicine, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia*^b *Novosibirsk State University, Russia*^c *G.K.Boreskov Institute of Catalysis, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia*

The principal results concerning the preparation and application of molecularly imprinted polymers able to specifically recognize biologically active compounds are presented. The principles of production of highly efficient molecularly imprinted polymers specific to the specified patterns are discussed. Special attention is paid to imprinting of highly structured macromolecular and supramolecular templates. The existing and potential applications of molecularly imprinted polymers in various areas of chemistry and molecular biology are considered. Bibliography — 261 references.

Photochemical transformations of diazocarbonyl compounds: expected and novel reactions

O.S.Galkina, L.L.Rodina

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Photochemical reactions of diazocarbonyl compounds are well positioned in synthetic practice as an efficient method for ring contraction and homologation of carboxylic acids and as a carbene generation method. However, interpretation of the observed transformations of diazo compounds in electronically excited states is incomplete and requires a careful study of the fine mechanisms of these processes specific to different excited states of diazo compounds resorting to modern methods of investigation, including laser technology. The review is devoted to analysis of the new data in the chemistry of excited states of diazocarbonyl compounds. Bibliography — 155 references.