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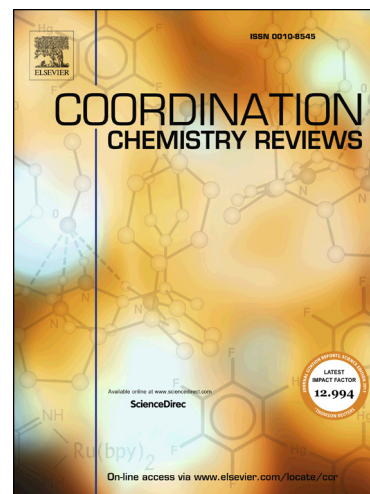
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Design and applications of molecular probes containing porphyrin derivatives

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Abstract

Porphyrins are heterocyclic macrocycle organic compounds, composed of four modified pyrrole subunits interconnected at their α carbon atoms via methine bridges. Because of their unique properties, synthetic porphyrin derivatives are powerful tools for molecular recognition. The optical or electronic monitoring of porphyrin derivatives permits the detection of the binding of transition metals. The binding of the metal ion to the porphyrin center provides additional axial ligand binding sites, which can be utilized for molecular recognition and sensing. Because of the large extinction coefficient and emission property, porphyrin derivatives can be utilized as fluorescent chromophores for the detection of various chemicals. In this paper, important development in terms of porphyrin-based chemical probes will be reviewed. This review is divided into nine sections focusing on porphyrin-based probes for (i) cations, (ii) anions, (iii) ion pairs, (iv) volatile organic chemicals, (v) nitroaromatic compounds, (vi) gases, (vii), reactive oxygen species, (viii) chiral discrimination, and (ix) environmental change detection, respectively.

Keywords: Porphyrin, fluorescent probe, molecular recognition, anion binding, metal ions

Highlights:

- Porphyrin derivatives serve as fluorescent chromophores to detect chemicals.

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