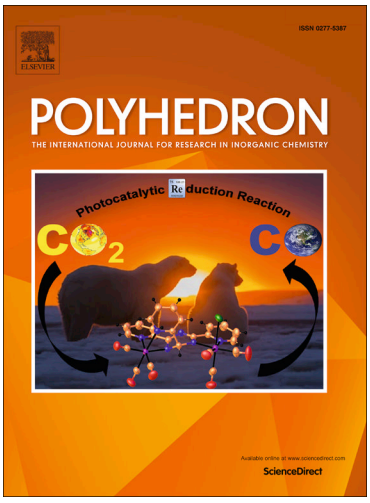

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Synthesis, crystal structure and DNA/protein binding of tetranuclear Cu(II) complexes with a double-open-cubane like core framework

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Abstract

The copper(II) complexes $[Cu_4(L)_2(HL)_2(H_2O)_2]\cdot 2(ClO_4)\cdot 2(H_2O)\cdot DMF$ (**1**) and $[Cu_4(L)_2(HL)_2(H_2O)_2]\cdot(tp)$ (**2**) [H_2L = 2-ethoxy-6-[(1-hydroxymethyl-propylimino)-methyl]-phenol; tp = terephthalate] have been synthesized and characterized by single crystal X-ray diffraction and spectroscopic studies. The structural determination reveals that both the complexes are tetranuclear with a double-open-cubane like core framework. The 2D supramolecular structure of **1** and 3D supramolecular structure of **2** are formed through C-H…π and hydrogen bonding interactions, respectively. At room temperature both the complexes exhibit fluorescence with quantum yields of 0.41 and 0.40. The interactions of the complexes with calf thymus DNA (CT-DNA) and serum albumins were investigated using electronic absorption and fluorescence spectroscopic techniques. The studies revels that the binding affinities of **1** and **2** with CT-DNA are of the order 8.86×10^5 M^{-1} and 7.14×10^5 M^{-1}, respectively. Additionally, the interaction of the complexes with bovine serum albumin and human serum albumin were studied and the number of binding sites and binding constants were calculated using a double logarithm regression equation. The redox activities of the complexes were investigated in methanol solution by cyclic voltammetry.