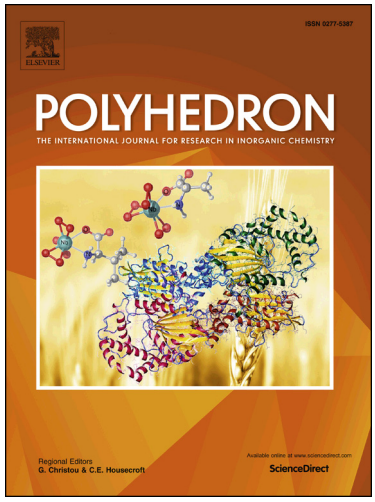

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Design, Synthesis and Crystal Structure of Six Macrocyclic Complexes as Efficient and Effective Nitric Oxide Scavengers

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ABSTRACT four new complexes of Robson-type macrocycles, $[CuH(L^1)]_2(ClO_4)_2(H_2O)_2$ (**1**), $[CuH(L^2)]\ ClO_4$ (**2**), $[Cu\ H(L^3)]_2(ClO_4)_2$ (**3**), $[Cu\ H(L^4)]_2(ClO_4)_2(CH_3CH_2OH)_2(CH_3CN)_2$(**4**) and two reported Robson-type macrocycles polymers $\{[CuL^5](H_2O)_2\}_n$(**5**), $\{[MnL^5](H_2O)_2\}_n$ (**6**) were obtained. The ligands (H_2L^1, H_2L^2,H_2L^3) are the products from the condensation between bata and N,N'-bis(3-formyl-5-X-salicylimine)-1,2-ethylenediimine (X=CH_3, Cl, F), respectively. Ligands H_2L^4 and H_2L^5 are the products of N,N'-bis(3-formyl-5-methylsalicylimine)-1,2-propylenedi-imineand condensation with bafa and bapa, respectively. All the metal ions have unsaturated coordinated sites, which are available for NO binding. The binding of the complexes with NO molecules have been confirmed by UV-Vis spectrophotometry. The binding constants were calculated to be $1.28 \times 10^3\ M^{-1}$, $8.9 \times 10^2\ M^{-1}$, $7.7 \times 10^3\ M^{-1}$,$1.2 \times 10^3\ M^{-1}$,$1.2 \times 10^3\ M^{-1}$,$1.3 \times 10^3\ M^{-1}$ for **1**, **2**, **3**, **4**, **5** and **6**, respectively. The control experiments revealed there was non-reversible binding of NO, which can be ascribed to specially coordination environment of the central ions. Moreover, the interactions of the complexes with calf thymus DNA (CT-DNA) have been measured by agarose gel electrophoresis, and unobvious DNA cleavage ability of complexes **1**, **3** and **4** indicating no damage to DNA. The results reveal that complexes **1**, **3** and **4** can be served as potential NO scavengers.

KEYWORDS Macrocyclic complex, Crystal structure, Nitric oxide scavenger, DNA binding

INTRODUCTION

Nitric oxide (NO), produced by a number of nitric oxide synthase (NOS) enzymes from L-arginine in the body, is an important signaling molecule involved in the regulation of different physiological processes such as neural transmission, regulation of cardiovascular function, apoptosis, and immune defense in mammals[1,2]. Being a free radical, nitric oxide is highly toxic to the cells. NO exhibits an important role in maintaining the vasodilatory tone of tumors by regulating tumor blood flow and is closely linked to the growth and progression of several human tumors[3-6]. Overproduction of NO contributes significantly to various diseases such as sepsis, arthritis, diabetes and epilepsy[7-9]. Hence the molecules which could donate as well

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