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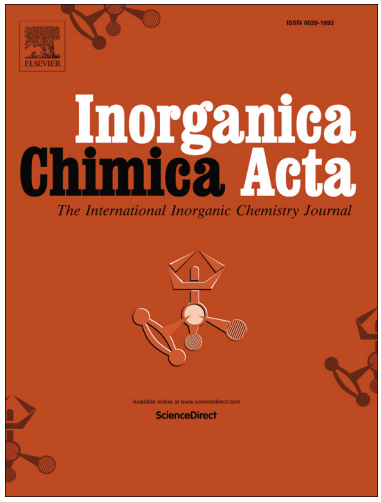

Research paper

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Synthesis, Characterization, Cytotoxicity Effect and DNA Cleavage Study of Symmetric Dinuclear Chloro and Azido Bridged Copper(II) Complexes of Napthyl-pyrazole Based Ligand

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Abstract: Symmetric dinuclear chloro copper(II) complex $[Cu(L)(Cl)(\mu\text{-}Cl)]_2$ (**1**) and azo dinuclear azido copper(II) complex $[Cu_2(L)_2(N_3)_3(\mu_2\text{-}N_3)]_n$ (**2**) [where L represents (5-methyl-pyrazol-1-ylmethyl)-napthalen-1-ylmethyl-amine] have been synthesized to examine the effect of napthyl group in the structure of pyrazole based dinuclear copper(II) complexes in DNA nuclease activity. The structure of **1** and **2** are characterized by X-ray crystallography, electrochemistry and various spectroscopic techniques. Coordinating ligand L is generated in situ from bis(3,5-dimethyl-pyrazol-1-ylmethyl)-napthalen-1-ylmethyl-amine (A) during complexation. Cytotoxic potential of free ligand (A), synthesized complexes **1**, **2** and one cobalt(II) complex derived from ligand A, $Co^{II}(A)Cl_2$ (**3**) are analyzed using MTT cytotoxicity assay in U937 human monocytic cell line. Complexes **1** and **2** show very potent cytotoxicity (IC_{50} = 13–17 μM); the best IC_{50} value is found for **1**. LDH assay revealed that A and **3** has greater necrotic activity than the copper complexes. However, the results of DNA cleavage study clearly demonstrated that symmetric bridged dinuclear complexes with napthyl group lead to high level of nuclease activity 72–75% in the presence of glutathione. The bridged dinuclear copper(II) complexes undergo facile transformation to Cu(I) centre through inner sphere electron transfer mechanism (ISET) in presence of glutathione which facilitate the formation of free