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Selective and sensitive colorimetric naked-eye detection of Cu²⁺ ion by a triazole-linked glucofuranose derivative in aqueous medium

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Keywords: Triazole-linked glucofuranose; Cu²⁺; Naked-eye; Colorimetric; Aqueous media.

Abstract:

Simple and cost-effective triazole-linked glucofuranose derivatives **1** and **3** were designed, synthesized and characterized by NMR and HRMS. The high selectivity and sensitivity of sensor **1** towards Cu²⁺ were established by colorimetric, UV-vis, FTIR, HRMS, DFT and TDDFT experiments along with UV-vis measurement of model compound **3**. It exhibits the color change from yellow to colorless in presence of Cu²⁺ ion only over various cations and anions in a wide pH range which can be easily detected by naked-eye. The observed detection limit of **1** for Cu²⁺ ion was found to be 3.50 μM which is much lower than WHO's suggested value in drinking water (31 μM) and other reported values.

1. Introduction

The design and development of sensors for selective and sensitive detection of metal ions and anions have gained remarkable attention worldwide due to their applications in biology, chemical, clinical and environmental sciences [1-5]. In general, metal ions play crucial roles in common processes including osmotic regulation, catalysis, metabolism and biomineralization

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