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A benzohydrazide based two-in-one Ni²⁺/Cu²⁺ fluorescent colorimetric chemosensor and its applications in real sample analysis and molecular logic gate

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Graphical abstract

A novel simple reversible Schiff base chemosensor N-(2-hydroxybenzylidene)-2-(benzamido)benzohydrazide (**L**) has presented for the first time. The receptor **L** is successfully applied for the detection of Ni²⁺ and Cu²⁺ ions, both colorimetrically and fluorometrically in aqueous medium. The detection limit reaches up to 2.22×10^{-6} M and 2.04×10^{-7} M in chromogenic measurements and 1.61×10^{-6} M and 2.26×10^{-6} M from fluorogenic measurements for Ni²⁺ and Cu²⁺ ions respectively. The binding mode of the probe **L** with Ni²⁺ and Cu²⁺ ion is determined to be a 1:1 complexation stoichiometry using Job's plot analysis and further confirmed by ESI-MS spectra and DFT calculations. The synthesized chemosensor (**L**) has been applied in real sample analysis and formation binary logical device.

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