Abstract

A Schiff base chemosensor, N-benzylidene-4-nitroaniline, referred as (L1), was synthesized from benzaldehyde and 4-nitroaniline for the selective detection of silver ions (Ag^{+}). The synthesized sensor was characterized using UV/Vis, fluorescence, and FTIR spectroscopy to confirm its structural features. Fluorescence studies revealed that L1 exhibited a strong and selective response toward Ag^{+} ions, with negligible interference from other common metal cations, including Al^{3+}, Bi^{3+}, Fe^{3+}, Co^{2+}, Ni^{2+}, Cu^{2+}, Zn^{2+}, Hg^{2+}, and Pb^{2+}. The addition of Ag^{+} ions to the L1 solution resulted in a significant enhancement of fluorescence intensity, whereas no notable response was observed with other cations. The detection limit for Ag^{+} was determined to be 0.4 μM, demonstrating the sensor's high sensitivity. These findings suggest that Schiff base L1 offers a simple, cost-effective, and reliable approach for the selective detection of silver ions.

Graphical Abstract: