**Fabrication of an optical sensor based on the immobilization of Qsal on the plasticized PVC membrane for the determination of copper(II)**

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**Abstract**

A novel optical sensor has been proposed for sensitive determination of Cu(II) ion in aqueous solutions. The copper sensing membrane was prepared by incorporating Qsal (2-(2-hydroxyphenyl)-3H-anthra[2,1-d]imidazole-6,11-dione) as ionophore in the plasticized PVC membrane containing tributyl phosphate (TBP) as plasticizer. The membrane responds to Cu(II) ion by changing color reversibly from yellow to dark red in acetate buffer solution at pH = 4.0. The proposed sensor displays a linear range of 6.3 × 10−7–1.00 × 10−4 M with a limit of detection of 3.3 × 10−7 M. The response time of the optical sensor was about 3–5 min, depending on the concentration of Cu(II) ions. The selectivity of the optical sensor to Cu(II) ions in acetate buffer is good. The sensor can readily be regenerated by hydrochloric acid (0.1 M). The optical sensor is fully reversible. The proposed optical sensor was applied to the determination of Cu(II) in environmental water samples.

**Keywords:** Optical sensor, Ionophore, PVC membrane, Plasticizer, Absorbance, Semiempirical PM6 calculations.