Optical Chemosensor For Determination Of Pb$^{2+}$ In Aqueous And Immobilized Medium

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A new optical sensor for sensing of Pb(II) in immobilized phase (PVC film) and ethanol medium was developed by using 5,10,15,20-tetra-o-bromohydroxyphenyl porphyrin (TBrHPP) synthesized (Figure 1). The photostability, relative signal change, optimum pH range and dynamic working range for Pb-porphyrin complex were studied. In the past decades, porphyrin compounds have attracted much attention as analytical reagents and particularly as chromogenic ligands for various metal ions [1,2]. Characteristic properties of porphyrins such as strong affinity toward metals, high photoreactivity and diverse redox behaviour originate with their electronic properties. Entrapment of fluorescent molecules in PVC films allows the investigation of both photophysical and photochemical properties and sensor applications [3]. PVC films were prepared from a mixture of polyvinyl chloride, bis(2-ethylhexyl)phthalate, anionic derivative reagent potassium tetrakis(4-chlorophenyl)borate and TBrHPP in tetrahydrofuran. TBrHPP had a strong fluorescence in both immobilized and solution medium. Because of having higher fluorescent intensity, the wider linear range for Pb(II) detection using TBrHPP in PVC film was obtained. This was of great importance for Pb(II) determination at high concentration. The soil analysis results obtained in two different mediums were demonstrated the applicability of present method for Pb(II) detection in various kinds of samples.

Figure 1. Preparation of TBrHPP

References


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