Selective Determination of Copper(II) Based on Cu(II)-Metal-Organic Framework in different Water Samples

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Four new modified electrodes are carbon pasted (*o*-NPOE; electrode I and DOS; electrode II); and screen-printed electrodes (*o*-NPOE; electrode III and DOS; electrode IV) based on Cu(II)-metal-organic framework ionophore were constructed for determination of copper ion (Cu(II)) over wide concentration ranges. The prepared electrodes exhibit Nernstian slope of 28.81 ± 0.31 , 29.43 ± 0.74 , 29.61 ± 0.20 and 30.04 ± 0.22 mV decade⁻¹ towards Cu(II) ion over a wide concentration range of 10^{-6} - 10^{-2} and 4.9×10^{-7} - 1.0×10^{-2} mol L⁻¹ with a detection limit of 1.0×10^{-6} and 4.9×10^{-7} mol L⁻¹ at pH range from 3.0 - 8.0, 3.0 - 8.5, 3.0 - 8.0 and 2.5 - 8.5 for electrodes I, II, III and IV, respectively. Updated electrodes exhibited a stable and repeatable potential throughout 86, 103, 195 and 205 days for electrodes I, II, III and IV, respectively. The modified electrodes showed strong selectivity for Cu(II) ion against a large variety of cations. The suggested electrodes were effectively used for the identification of Cu(II) ion in various samples of water and the produced data were well compared to the results obtained using inductively coupled plasma atomic emission spectrometry (ICP-AAS).

Keywords: Cu(II)-metal-organic frameworks; ionophore; Potentiometric; copper ions.

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