Synthesis and Application of MWCNT-SPIMP as a Suitable Neutral Carrier for Construction of New Copper Selective Carbon Paste Electrode

Mina Behfar^{1*}, Mehrorang Ghaedi², Rezvan Behfar³

¹Young Researchers and Elite Club, Gachsaran Branch, Islamic Azad University, Gachsaran, Iran

²Department of Chemistry, University of Yasouj, Yasouj 75914-353, Iran

³Department of Chemical Engineering, University of Arak, Arak, Iran

*E-mail: Mina_Behfar_65@yahoo.com

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In this research Multi-walled carbon nanotube (MWCNT) surface was modified chemically by a couple of reactions between trimethoxysilyl- propyl-amine (TMSPA) and (2)-hydroxybenzaldehyde (2-HBA) which is then characterized by FT-IR technique. This new material (MWCNT-SPIMP) in carbon paste electrode, matrices selectively the Cu²⁺ ion. The influence of variables including sodium tetraphenylborate ((C₆H₅)₄BNa), some amount of MWCNT-TMSPA, Nujol and graphite powder on electrode response has been investigated and their value was set as graphite powder: NaTPB: Nujol: carrier in the mass (mg) ratio of 150/6.0/30.0/50 for this electrode. At the optimum it was set as the proposed ion selective electrode response, and is linear over the wide range concentration of 1.0×10^{-8} to 1.0×10^{-2} mol L⁻¹ with slopes of 30.01 per decade of ion concentration and detection limit of 8.8×10^{-9} mol L⁻¹. The response of this electrode is independent of pH in the range of 3.0-6.0 with a short response time of about 5s. This electrode successfully has been applied for potentiometric determination of Cu²⁺ ion content in various real samples and as indicator electrodes for potentiometric titration.

Keywords: Cu²⁺-selective electrode, Potentiometric sensor, Carbon paste electrode, Multiwalled Carbon Nanotubes.

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