A novel and Disposable Amperometric Hydrazine Sensor based on Polydimethyldiallylamine Stabilized Copper(II)hexacyanoferrate Nanocubes modified Screen-printed Carbon Electrode

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A cubic shaped copper(II)hexacyanoferrate was prepared by wet chemical method by mixing an equimolar concentration of CuCl_2 with $\text{K}_3[\text{Fe}(\text{CN})_6]_2$ in the presence of poly(diallyldimethylammonium chloride) (PDDA). The X-ray diffraction, field emission scanning electron microscopy, elemental analysis, Fourier transform infrared spectroscopy and thermal gravimetric analysis were used to confirm the formation of PDDA stabilized copper(II)hexacyanoferrate nanocubes (PDDA@copper(II)hexacyanoferrate nanocubes). The electrocatalytic behavior of the PDDA@copper(II)hexacyanoferrate nanocubes modified screen-printed carbon electrode (SPCE) towards electrochemical oxidation of hydrazine was studied by cyclic voltammetry (CV). The CV results revealed that PDDA@copper(II)hexacyanoferrate nanocubes modified SPCE exhibits an enhanced electrocatalytic activity and lower oxidation potential towards hydrazine than bare SPCE. Under optimized conditions, amperometric i - t method was used for the determination hydrazine, and PDDA@copper(II)hexacyanoferrate nanocubes modified SPCE can able to detect hydrazine in the linear concentration ranges from 0.03 to 533.6 μM with a detection limit of 10 nM. The PDDA@copper(II)hexacyanoferrate nanocubes modified SPCE is highly selective in the presence of potentially active interfering compounds including high concentration of ascorbic acid. In addition, the developed hydrazine sensor shows acceptable practicality with excellent long-term

stability towards the detection of hydrazine.

Keywords: Screen-printed carbon electrode; PDDA@copper(II)hexacyanoferrate nanocubes, PDDA, electro-oxidation, hydrazine, amperometry.

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