Electrochemical detection of Mn(II) and Cd(II) mediated by carbon nanotubes and nanotubes/Li+ modified glassy carbon electrode.

ABSTRACT

Glassy carbon electrode (GCE) was modified with carbon nanotubes (CNT) with andwithout a Li+ dopant by using a mechanical attachment method; CNT/Li+/GCE was used as twoworking electrodes, by doping CNT/GCE with Li+. The nano-structure of the electrodes showedindividual voltammetrics of Mn2+ with two reduction peaks at +800 and +100 mV. Two reduction peaks for Cd2+ appeared at +600 V and -800mV with one oxidation peak at -600 mV. The reductioncurrent of Mn2+ and the redox current of Cd2+ on the CNT/Li+/GCE were largely influenced by a lowconcentration comparison with GCE and CNT/GCE. It showed that the detection of Mn2+ and Cd2+ byCNT/Li+/GCE in an aqueous solution of 0.1M KCL, with a relative standard deviation (RSD) of theelectrode being very good CNT/Li+/GCE. The determination of efficiency for the best modifiedelectrode was detected for Mn2+ and Cd2+ on CNT/Li+/GCE; it was also found to have a wide linear range and good repeatability with a relative standard deviation (RSD) of ±1.9 % when this electrodewas used and the limit of detection was found to be 10-4 to 10-3 mM of Mn2+ and 10-4 to 10-2 mM of Cd2+, while the range of detection was found to be 3x10-4 to 10-3 mM and 10-3 to 10-2 mM when usingthe CNT/GCE for Mn2+ and Cd2+, respectively, with an RSD of ±3.3 % for Mn2+ and Cd2+.

Keyword: CNT/GCE; CNT/Li+/GCE; Mg(II); Cd(II); Electrocatalysis.