Electrochemical reduction of Mn(II) mediated by C60/Li+ modified glassy carbon electrode.

ABSTRACT

Glassy carbon electrode (GCE) was modified with C60 C60/GCE) by a solution evaporation technique, C60/Li+/GCE was prepared by modifying C60/GCE in Li+ solution via cv potential cycling. Two reduction peaks of Mn(II), which appear at +600 and -100 mV vs Ag/AgCl at GC electrode increased considerably with slight peak shifting when the two modified GCE electrodes were used. The sensing characteristics of the modified film electrodes, demonstrated in this study comprised of: (i) a wide working potential window ranging from +1.8 to -1.8V (depending on different scan rate, pH, concentration and temperature); (ii) a wide applicable pH range (at least from 2 to 11); (iii) a wide applicable temperature range 30-90oC; (iv) a satisfactory linear voltammetric and amperometric response to various analytes; (v) good reproducibility; (vi) Other heavy metal ions such as Hg2+, Cd2+ and Cu2+ appear to exert positive interference on the reduction peaks of Mn2+ and (vii) stable and fast current response . The reduction current response of Mn(II) at C60/Li+/GCE is also significantly dependent on pH, temperature, concentration and scan rate. Based on the surface charge determined by chronocoulometry (CC), C60/Li+/GCE appears more conductive in acidic solution than in alkaline. Based on Cottrell equation, diffusion coefficient of 5.12x 10 -6cm2/sec for the reduction of Mn2+ was determined.

Keyword: Electrocataysis; C60/Li+/GCE; C60/GCE; Mn (II); Cyclic voltammetry.