

Electrochemical reduction of potassium ferricyanide mediated by magnesium diboride modified carbon electrode.

Abstract

Use of a glassy carbon (GC) modified by adhered microparticles of MgB₂ mediates the reduction process of Fe(III)(CN)₆³⁻ during cyclic voltammetry. Peak potential was observed to shift slightly to less negative value by about 50 mV and current is significantly enhanced by about two folds. The sensitivity under conditions of cyclic voltammetry is significantly dependent on pH, electrolyte and scan rate. The result of scanning electron micrograph of MgB₂ obtained before and after electrolysis show the size increased slightly to the size ranging from 2 - 5.5 μm attributing to the hydration effect and/or incorporation of some ionic species into the crystal lattices of MgB₂. Interestingly, redox reaction of Fe(III) solution using modified GC electrode remain constant even after 15 cycling. It is therefore evident that the MgB₂ modified GC electrode possesses some degree of stability. Potential use of MgB₂ as a useful electrode material is therefore clearly evident.

Keyword: Solid state voltametry of microparticles; MgB₂ modified GC electrode; Fe(III)/(II) redox couple; Electrocatalysis.