

Potential application of WC-Pt as anode catalyst of DMFC

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Polymer Electrolyte Membrane Fuel Cells (PEMFCs) are recently attractive for zero emission electric vehicles. For particular, direct methanol fuel cell (DMFC), used methanol as fuel, have been studied intensively due to many advantages such as high energy density, the ease of handling, and low operation temperature. The high exchange current densities of hydrogen on platinum group metals make these the most suitable electrocatalytic materials for the fuel cell anode in acidic electrolyte. However, platinum catalyst not only is poisoned easily by CO but also is very expensive. There has been considerable interest in the catalytic properties of tungsten carbides since they show exceptionally high activities similar to those of precious metal catalysts in a number of reactions, such as electrooxidation of methanol, hydrogen, formic acid, and carbon monoxide. In this work, a WC-Pt nanocrystalline electrode for use in highly catalytic reaction was fabricated by means of a co-sputtering system. The WC-Pt nanocrystalline catalysts showed an enhanced performance, compared with that of a pure Pt electrode without an oxide matrix.