

### Bimetallic Tungsten Carbides as Alternative Electrocatalyst for PEMFC

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WC has been specified by various phases such as tungsten mono-carbide (WC), tungsten bi-carbide and tungsten partial oxidized form. Among them, WC has been reported as high electrochemical activity and stability in acidic condition like low temperature fuel cells than other WCs. In spite of those properties, electrochemical activity of WC for PEMFC is too low. In this point of view, various bimetallic WCs were synthesized including MoWC, CoWC and FeWC. XRD data shows tungsten mono-carbide phase for MoWC, CoWC and mixture phase of tungsten mono-carbide and tungsten bi-carbide for FeWC. The sizes of sample were compared with TEM image and the presence of transition metal was verified by EDS image. The cyclic voltammetry results showed that electrochemical activity increment of bimetallic tungsten carbide compared to pure tungsten carbide and higher current density at 0.9V (v.s. Ag/AgCl electrode) except FeWC.