

The Enhancement of Corrosion Resistance for WC-Co by Ion Beam Mixed Silicon Carbide Coating

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A strong adhesion of a silicon carbide (SiC) coating on a WC-Co substrate was achieved through an ion beam mixing technique and the corrosion resistance of the SiC coated WC-Co was investigated by means of a potentiodynamic electrochemical test. In the case of 1 M NaOH solution, a corrosion current density for a SiC coated WC-Co with a heat treatment at 500 °C displays about 50 times lower than that for the as-received WC-Co. However, in the case of 0.5 M H₂SO₄ solution, a corrosion current density for a SiC coated WC-Co displays about 3 times lower than that for as-received WC-Co. We discussed the physical reasons for the changes of the corrosion current densities at the different electrolytes.