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Effect of preparation technology on arc erosion resistance of MgO/Cu contact materials

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ABSTRACT

With MgO particles as reinforcements, MgO/Cu contact materials with 1.0% volume fraction of MgO particles were fabricated by internal oxidation and powder metallurgy, respectively. The microstructure of MgO/Cu contact materials prepared and interface bonding state between MgO particles and copper matrix of MgO/Cu contact materials were characterized by transmission electron microscopy (TEM) and scanning electron microscopy (SEM). Arc erosion resistance of the MgO/Cu contact materials was tested by JF04C electrical contact material testing system. Effects of preparation technology on arc erosion resistance of MgO/Cu contact materials were studied. The results show that interface bonding states of MgO particles and copper matrix are very important for arc erosion resistance of MgO/Cu contact materials. The MgO/Cu composite with semi-coherent interface with 14% misfit degree prepared by internal oxidation has lower arc erosion rate and a small fluctuation of arc energy within the operation 5000 times. Erosion morphology observation shows that smaller electric erosion pits distribute uniformly on arc surface of MgO/Cu contact materials with semi-coherent interface prepared by internal oxidation, whereas the pits on arc surface of MgO/Cu composite with incoherent interface are bigger with large electric erosion molten droplets.