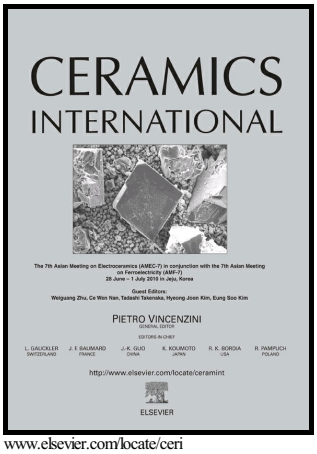

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Abstract

In this study, in order to determine the effect of SiC nanoparticles on tribological properties of nanostructured copper, the dry sliding wear and friction behaviors of nanostructured copper and copper reinforced with silicon carbide nanoparticles, produced by high energy ball milling and spark plasma sintering, were investigated by using an oscillating friction and wear tester under different normal loads. To determine the dominant wear mechanism, the worn surfaces and obtained debris after wear tests were analyzed by scanning electron microscope (SEM). The results showed that the addition of 4vol. % silicon carbide to copper matrix reduced the wear track depth and the coefficient of friction. Investigation of the worn surfaces revealed that SiC nanoparticles on the top of worn surface decreases the plastic deformation in subsurface region and alleviate severe wear. Lower plastic deformation during dry sliding wear test was attributed to high hardness of the nanocomposite that has been resulted from grain growth inhibiting and reinforcing effects of the nanoparticles. Plastic deformation and delamination were determined as major wear mechanisms in both materials.