

Studies on Mechanical Alloying of Copper-Tungsten Carbide Composite for Spot Welding Electrode

Abstract

This article presents a study on the properties and performance of copper-based composite reinforced with recycled tungsten carbide powder as spot welding electrode. The copper-tungsten carbide composite electrode was prepared by mechanical alloying and powder forging before being machined into truncated cone-face geometry. The welding operation was conducted on galvanized steel using a pedestal-type spot welding machine. Composites with higher density and electrical conductivity were obtained after mechanical alloying for shorter time. In contrast, a higher hardness is shown in the composite, which was mechanically alloyed to longer time. The strength of the welded steel coupon was found to increase with decreasing milling time due to an increase in density and electrical conductivity. The wear behavior of the composite revealed that the deformation of the spot weld electrode increased with increasing milling time.

Keywords mechanical alloying - metal matrix composites - welding