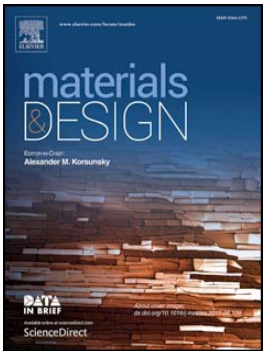

Cu/C composites with a good combination of hardness and electrical conductivity fabricated from Cu and graphite by accumulative roll-bonding

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Cu/C composites with a good combination of hardness and electrical conductivity fabricated from Cu and graphite by accumulative roll-bonding

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Abstract

Cu/C composites were prepared from Cu and graphite by accumulative roll-bonding (ARB) up to 30 cycles (*N*) with a 50% thickness reduction per cycle at room temperature. The microstructure and properties of the Cu/C composites were investigated. Results showed that ARB can remarkably decrease the size of graphite and improve the dispersion of graphite in the Cu matrix. Moreover, significant thickness reduction (down to ~5 graphene layers) of the graphite was found in the Cu/C composites fabricated by ARB. The microhardness of the Cu/C composites increases with increasing *N* and is ~3.3 times that of pure Cu for *N* = 30. The electrical conductivity of the Cu/C composites decreases slightly with increasing *N*, with a minimum of ~90% IACS for *N* = 30. Our study indicated that ARB can be an effective method for fabrication of Cu/C composites from Cu and graphite with a combination of hardness and electrical conductivity better than or as good as that of carbon nanotube or graphene reinforced Cu matrix composites as reported.

Keywords: Cu/C composites; accumulative roll-bonding; graphene; hardness; electrical conductivity