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Influence of carbon coating with phenolic resin in natural graphite on the microstructures and properties of graphite/copper composites

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Abstract

Carbon-coated graphite/copper composites were fabricated by using electrolytic copper powder and phenolic resin-coated graphite as raw materials via powder metallurgy method. The effect of natural graphite with phenolic resin coating on the microstructures and properties of graphite/copper composites was investigated. The results indicated that the surface of natural graphite was modified by phenolic resin. Smooth amorphous carbon shell with the thickness of 40 nm to 1 μm was formed on the surface of natural graphite after carbonizing at 900 ℃ for 2h under hydrogen atmosphere. The sintering of Cu particles was accelerated by phenolic resin coating, and a continuous network-shaped Cu matrix with isolated graphite phase was formed in carbon-coated graphite/copper composites. The electrical conductivity, flexural strength, and tribological properties of graphite/copper composites were improved.

Keywords: carbon coating; metal matrix composites; powder metallurgy; microstructure

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