

Synthesis of Nano Cu-Ni Alloy by Levitational Gas Condensation Method Using Micron Powder Feeding System

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Abstract

The levitational gas condensation (LGC) using new micron powder feeding system was investigated and invented for synthesis of nano powder with various and complicate atomic concentration. The fabrication of nano Cu-Ni alloy was chosen for optimizing process of powder feeding system, and its structural and shape properties were studied by XRD and TEM. The parent materials of Cu and Ni powder with an average size of 150 μm evaporated from the surface of the levitated liquid Cu-Ni droplet and then condensed into nanoparticles of Cu-Ni alloy with particle sizes of 12 to 35 nm in a chamber filled with Ar gas. The feeding speed of parent materials of mixed Cu and Ni was constant velocity of 65 mg/min. The pressure of Ar gas was continued about 100 torr during synthesizing alloy. The passivated treatment was carried out for as-prepared Cu-Ni alloy powders. Most of particles consist of single domains with spherical shape.