

Impurity and Internal energy Effect on Morphological Change of W Particle during Liquid Phase Sintering of Cu-W Composite Powder
Prepared by Mechanical Alloying.

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W particle in liquid Cu was generally observed to be nonfaceted, showing no anisotropy in solid-liquid interfacial energy. However, when W and Cu were subjected to mechanical milling treatment, the morphology of W particle in the liquid Cu was reported to be faceted. This phenomenon could be related to the elastic strain field or impurities. The mechanical milling process may introduce a variety of structural defects such as vacancy and dislocation. The introduction of structural defects can cause the elastic strain to form not present on the Wulff shape, and provide anisotropy in growth rate, leading to faceted morphology. The morphological change can also be attributed to the impurity (Fe, Ni) effect induced during MA process. The effect of Fe and Ni on the sintering of Cu-W system is very important, because small amount of the impurities results in an enhanced sinterability as well as rapid particle growth in this system :that is, the activated sintering. In the present work, Relationship between the shape change of the W particle in contact with liquid Cu and the excess stored strain energy of W particle was examined by means of DSC, XRD, ICP and SEM. The impurities effect of morphological change of W particle prepared by attrition mill using ceramic container and balls was discussed.