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An Empirical Law for the Elastic Moduli of Component-Segregated W/Cu Compounds

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ABSTRACT

The atomic structures and the elastic moduli of W/Cu compounds with different ratios of Cu-to-W are studied by utilizing tight-binding potential model. It is found that W/Cu compounds with different Cu-to-W ratios exhibit different microstructural characteristics, where the component segregation occurs when the compound is cooled from high temperatures. Furthermore, an empirical law is proposed, by which the elastic behavior and the ductile properties of W/Cu compounds with various ratios of Cu-to-W are described very well. Such an empirical law may provide a guide for experiment to synthesize the W/Cu compounds with the desired mechanical properties.

Keywords: W/Cu compounds; tight-binding potential model; atomic structure; empirical law; mechanical property

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