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Global Reactive Synthesis of Al-based metal matrix composites

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Votre résumé :

The present paper describes a new synthesis route for particulate reinforcement metal matrix composites, also called Global Reactive Synthesis. The process consists in the chemical reaction at high temperature between precursor materials to form in-situ both the matrix and the reinforcing phase. The main criteria that have to be considered to determine if a given matrix/reinforcement couple can be obtained by this route will be illustrated on specific examples. The main advantages are the quality of the matrix/reinforcement interface that is formed in-situ by a nucleation/growth mechanism (free of oxide layers) the homogeneity of the microstructure without any clustering effect, even for high volume fraction of reinforcement. Moreover, nano-sized particles of reinforcement with a mean size that is about 30 nm can be obtained without any handling of nano-sized powders. The interest of the Global Reactive Syntheis is also highlighted by unique mechanical properties showing high strength values associated with a failure elongation of 6%.

Mots clés : Metal matrix composite, microstructure, Particle reinforcement, thermodynamics

Conflits d'intérêts : None Declared