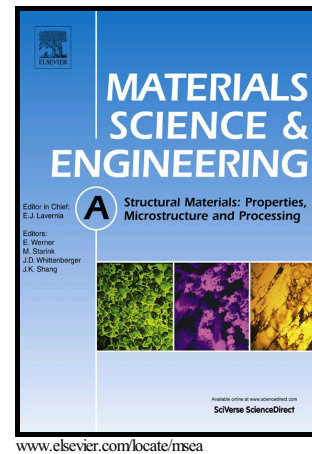


Author's Accepted Manuscript

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PII: S0921-5093(17)30683-4
DOI: <http://dx.doi.org/10.1016/j.msea.2017.05.067>
Reference: MSA35083

To appear in: *Materials Science & Engineering A*

Received date: 27 March 2017
Revised date: 16 May 2017
Accepted date: 17 May 2017

Cite this article as: Xu He, Jinling Liu and Linan An, The mechanical behavior of hierarchical Mg matrix nanocomposite with high volume fraction reinforcement *Materials Science & Engineering A* <http://dx.doi.org/10.1016/j.msea.2017.05.067>

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The mechanical behavior of hierarchical Mg matrix nanocomposite with high volume fraction reinforcement

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Abstract

Mg-based nanocomposite with hierarchical structure was synthesized via mechanical alloying followed by spark plasma sintering, which was reinforced by 15 vol.% nanometer-sized SiC particles. Microstructure was characterized by scanning electron microscopy (SEM) and transmission electron microscopy (TEM). It indicates that the hierarchical microstructure consists of an isolated soft pure Mg phase, with flake like morphology, uniformly distributed in the Mg/SiC nanocomposite. The quasi-static compression test demonstrates that the hierarchical nanocomposite shows significantly higher ductility than that of counterpart with homogeneous microstructure while the result of dynamic test suggests that the ductility of the hierarchical nanocomposite has not improved significantly at high strain rate. The fracture morphology shows both brittle and ductile features partially result from the flake-like soft phase, as well as the hierarchical microstructure.

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