

Accepted Manuscript

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PII: S1359-835X(17)30447-5
DOI: <https://doi.org/10.1016/j.compositesa.2017.12.013>
Reference: JCOMA 4862

To appear in: *Composites: Part A*

Received Date: 1 August 2017
Revised Date: 13 December 2017
Accepted Date: 15 December 2017

Please cite this article as: Ji, X., Wang, Q., Yin, F., Cui, C., Ji, P., Hao, G., Fabrication and properties of novel porous CuAlMn shape memory alloys and polymer/CuAlMn composites, *Composites: Part A* (2017), doi: <https://doi.org/10.1016/j.compositesa.2017.12.013>

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Fabrication and properties of novel porous CuAlMn shape memory alloys and polymer/CuAlMn composites

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ABSTRACT

Novel porous CuAlMn shape memory alloys (SMAs) with interconnected pores and polystyrene/CuAlMn composites with uniformly distributed polystyrene were successfully fabricated via sintering-dissolution and sol-gel methods. Properties tests indicated that the porous CuAlMn SMAs had excellent compression energy absorption and damping properties. Compared with porous CuAlMn SMAs, polystyrene/CuAlMn composites had higher compression strength and damping capacity, which had been ascribed to the hindering effect of polystyrene on the collapse of pores and the superposition of multiple damping sources, respectively. The addition of mica or graphite sheets in polystyrene could remarkably improve the elastic modulus, damping as well as storage modulus of the polystyrene/CuAlMn composites. The associated mechanisms were discussed.

Keywords: A. Metal-matrix composites (MMCs); B. Internal friction/damping; D. Mechanical testing; E. Powder processing

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