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Design novel Ti-based metallic glass matrix composites with excellent dynamic plasticity

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Abstract

A novel light-weight and high-toughness in-situ dendrite/metallic glass matrix composites (MGMCs) with a composition of $Ti_{58}Zr_{12}Ni_6Ta_{13}Be_{11}$ was designed. Quasi-static and dynamic compressive properties of MGMCs were investigated. The alloys showed excellent compressive properties of the maximum strength over 1.6 GPa and the total strain over 10% under the quasi-static loading. Under dynamic compressive loading, the compressive strength increased up to 1.9 GPa, whereas the total strain is nearly undiminished exhibited favourable plastic deformation. Deformation mechanisms related to the improvement of strength and ductility were investigated thoroughly by focusing on how ductile dendrites affected the initiation

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