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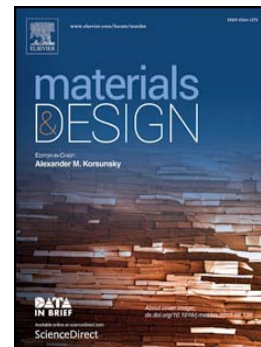
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A Hexagonal Close-Packed High-Entropy Alloy: The Effect of Entropy

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Abstract

The formation of disordered solid solution in the hexagonal close-packed (hcp) structure in the GdHoLaTbY alloy and its mechanical properties were investigated in this study. The single hcp phase of the alloy in the as-cast state was confirmed by X-ray diffraction and scanning electron microscopy analyses. The compressive yield strength, fracture strength, and plastic strain of the alloy are 108 MPa, 880 MPa, and 21.8 %, respectively, and the Vickers hardness is 96 HV. The results show that the yield strength, fracture strength, and hardness of the alloy obey the rule of mixture, which indicates that there is no hardening effect from entropy. Although the high entropy of mixing stabilizes the solid solution against intermetallic compounds, lack of severe lattice distortion from elastic strain or electronic

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