



MSEN 681 Seminar Series

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Finding Strength in our Faults: Superstrong Magnesium Alloys via Nano-Spaced Stacking Faults

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abstract

Magnesium alloys are some of the lightest structural metals, however their widespread application has largely been limited by the low strength and formability compared to other lightweight engineering alloys. In this talk, we report a new mechanism to create ultrastrong and moderately ductile magnesium alloys through conventional warm processing methods and appropriate computational design tools. Stacking faults with nanoscale spacing were introduced into a Mg-8.5Gd-2.3Y-1.8Ag-0.4Zr (wt.%) alloy by conventional hot rolling, which produced very high strengths approaching 600MPa. Low stacking fault energy played an essential role in producing a high density of stacking faults which impeded dislocation slip and promoted dislocation accumulation. These findings provide guidance for development of Mg alloys with unprecedented mechanical properties.