

Microstructure and Hardness Evolution in Magnesium Processed by HPT

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High pressure torsion provides an opportunity to process materials with low formability such as magnesium at room temperature. The present work shows the microstructure evolution in commercially pure magnesium processed using a pressure of 6.0 GPa up to 10 turns of rotation. The microstructure evolution is evaluated using electron microscopy and the hardness is determined using dynamic hardness testing. The results show that the grain refinement mechanism in this material differs from materials with b.c.c. and f.c.c. structures. The mechanism of grain refinement observed at high temperatures also applies at room temperature. The hardness increases in the early stage of processing and a slight softening is observed in the later stages. The softening is attributed to the onset of grain boundary sliding due to grain refinement.