

Abstract Submitted
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Ultra fine grain-sized zirconium by dynamic deformation¹ M.A. MEYERS, J.-M. GEBERT, M.T. PEREZ-PRADO, M.F. KASSNER, B.K. KAD, UCSD, La Jolla, CA 92093 — A polycrystalline zirconium alloy was subjected to high plastic strain at a high strain rate using the hat shape geometry in a split Hopkinson bar. A narrow shear deformation region was formed which cooled rapidly after deformation. The structure of this adiabatic shear band was analyzed by transmission and scanning electron microscopy (EBSD). It revealed equiaxed grains with approximate diameters of 200 nm. The process of microstructural evolution leading from an initial grain size of 14 μm to the final size is modeled. This process can be described as rotational dynamic recrystallization and is the result of the intense plastic deformation and superimposed adiabatic heating.

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