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Comparison of High Strain Rate Properties of Tantalum Processed by Equal Channel Angular Pressing PHILIP FLATER, JOEL HOUSE, Air Force Research Laboratory, JAMES O'BRIEN, O'Brien & Associates, WILLIAM HOSFORD, University of Michigan — Current ingot refinement and solidification techniques used in tantalum processing often result in inconsistent mechanical properties. Subsequent processing by equal channel angular pressing (ECAP) has been shown to reduce or eliminate internal structural variations as well as part-to-part variability [Hartwig, 2006]. This paper investigates the effects of ECAP processing on the properties of tantalum. The materials of interest are 2.5-inch round bar tantalum supplied by H.C. Starck and Cabot Supermetals. Three metallurgical conditions were examined for each material: as worked, fine-grain annealed, and large-grain annealed. Prior to annealing, each bar was processed eight times through a 135 degree ECAP die using route Bc then forged into 0.25-inch plates. Specimens were then removed from the plates. Mechanical properties were evaluated using low- and high-rate uniaxial compression experiments. Specimen load axis were oriented either through-thickness or in the plane of the original plate. Wave propagation and anisotropy were studied using the Taylor impact experiments. The experimental results and physical and mechanical characterization will be discussed.

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