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Investigation on Grain Size Effect in High Strain Rate Ductility of 1100 Pure Aluminum NICOLA BONORA, University of Cassino and Southern Lazio, NEIL BOURNE, University of Manchester, ANDREW RUGGIERO, University of Cassino and Southern Lazio, GIANLUCA IANNITTI, TECHDYN Engineering, GABRIEL TESTA, University of Cassino and Southern Lazio — The effect of the initial grain size on the material ductility at high strain rates was investigated. Dynamic tensile extrusion tests (DTE) at different impact velocities on 1100 commercially pure aluminum, annealed at 350 °C for different exposure times to induce grain growth, were performed. Extruded fragments were soft-recovered and the overall length of the extruded jet was used as measure of material ductility at high strain rates. Microstructure and texture evolution was investigated performing EBSD analysis of selected locations along the centerline of the fragment that remains in the extrusion die. The size and shape of retrieved fragments were used as validation metrics for the modified Rusinek-Klepaczko constitutive model used to simulate the deformation process.

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