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# VOID GROWTH AND COALESCENCE IN DYNAMIC FRACTURE FROM THE ATOMISTIC LEVEL

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## ABSTRACT

An important example of multiscale material response is the fracture of ductile solids. In the process of ductile fracture, voids nucleate, grow and coalesce, and it is this linking process that creates the fracture. Ductile fracture has typically been modeled at the continuum level, in a variety of models that may or may not model voids explicitly. Previously we have studied the plasticity associated with void growth in fcc metals, focusing on copper [1, 4, 8, 11, 12, 13, 10, 9]. In the work discussed here we examine void growth in single crystal and polycrystalline body-centered cubic (bcc) metals (V, Nb, Ta, Mo and W) subjected to tension at a high rate and high triaxiality. [2, 3] Large-scale atomistic models provide detailed information on void nucleation and growth and the plasticity generated as voids coalesce, based solely on the constitutive properties inherent in the interatomic forces. The details of the plasticity may be used to inform dislocation dynamics and continuum plasticity models in order to develop models that scale beyond the nanoscale. We also discuss concurrent multiscale modeling of void growth using Coarse-Grained Molecular Dynamics. [5, 6, 7]

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