3D Characterization of Damage within Copper Using Micro and Nano X-ray Tomography

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Laboratory based x-ray micro computed tomography (micro-CT) with the addition of a full measuring package, can lend measurements and statistics of voids within damaged materials that traditional 2D microscopy cannot. Micro-CT is used to image these materials and quantitatively measure the specimens' voids; their sizes, shapes, and distributions. Micro-CT also images the connectivity of voids, which may not be apparent in 2D. Damage studies of impacted copper at the incipient spall stage at various impact profiles will be shown. Additionally, sub-micrometer voids can be imaged using 3D nanoCT (resolution ~150 nm) which can also be quantified for shape and size. At this high resolution void surface facets can be imaged as the voids grow against copper grains. Comparisons between 2D microscopy will be shown highlighting the strength of this technique.