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Shock-wave propagation in carbon nanotube reinforced a-SiC composites DEEPAK SRIVASTAVA, MAXIM MAKEEV, NASA Ames Research Center, MS 229-1, Moffett Field, CA 94035 — We have performed state-of-the-art large-scale molecular dynamics simulation study of shock-wave propagation in amorphous silicon carbide (a-SiC) and carbon nanotube (CNT) reinforced a-SiC composites. The materials response, shock-wave structure, damage evolution and properties in shock-loaded CNT/a-SiC composites are found to differ significantly from the similar shock wave propagation in pristine a-SiC sample. The effects of CNTs on the shock-wave velocity and profile are investigated and analyzed in detail. In all the considered cases, a significant densification is observed in the shock-loaded regions. In the case of CNTs aligned perpendicular to the impact direction, the shock-wave causes CNTs to collapse, while in the case of CNTs oriented parallel to the impact direction the structure of the CNTs is preserved and a channeling of the resulting compressive wave is observed which leads to material sputtering at the bottom surface. The micro-structural changes in the after shock region will be discussed in this presentation.

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