

The Dynamic Granular Flow of An Advanced Ceramic

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The rheology of granular materials is known to be influenced by pressure, strain rate, porosity, particle shape, and particle size. We performed pressure-shear plate impact as well as quasi-static compaction experiments on three boron carbide powders of different grain sizes. The strain rates achieved range from as low as 10^{-3} s^{-1} up to 10^5 s^{-1} . We observe strong rate effects on the granular flow, and are able to quantify both compaction and shear. SEM characterization conducted on the deformed particles shows that continuing particle fracture is a key deformation mechanism.