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Shock Propagation and Spall Behaviour of Ceramic-doped Polyurea Composites.[1] ANDREW ODDY, ANTON LEBAR, RAFAELA AGUIAR , OREN PETEL, Department of Mechanical and Aerospace Engineering, CARLETON UNIVERSITY IMPACT RESEARCH LAB COLLABORATION —
The use of polyurea retrofitting of building interiors to improve survivability from blast effects has increased in recent years due to its high tensile strength and strain to failure. Prior research has shown that the addition of some particle reinforcements to high toughness polymers results in an increase in the tensile strength under quasi-static loading conditions. In the present study, ceramic powders are added to polyurea at various concentrations to study the effects of volume fraction and particle shape on the spall strength and shock propagation through the polyurea matrix. The ceramic powder shape is determined using SEM, Fourier Transform Infrared Spectroscopy is used to measure the degree of chemical adhesion between the ceramic particles and the polyurea matrix. The composites were characterized through shock propagation and spall experiments using the Carleton University single-stage gas gun and its multi-channel Photonic Doppler Velocimetry system.

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