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An extreme pressure attenuation in metals from a miniaturized pyrotechnic train configuration[1] JACK YOH, BOHOON KIM, HYEONJU YU, Seoul National University, SEOUL NATIONAL UNIVERSITY TEAM — A pyrotechnic device that consists of donor/acceptor pair separated by a bulkhead relies on shock attenuation in metal and shock sensitivity of the energetic materials. Despite of its common use, full-scale numerical simulation of such explosive train configuration is seldom reported because the proper modeling of the entire process requires precise capturing of extreme pressure waves from the donor charge during its attenuation in the metal before triggering of an acceptor charge and the accurate material modeling of high strain rate dynamics of both reactive and inert solids. The considered train consists of HMX as donor, STS 304 as the bulkhead, and RDX as acceptor. The simulation of such multi-material configuration reveals the critical bulkhead thickness for successful initiation of a pyrotechnic device. Furthermore, the miniaturization of such system is considered by obtaining the distance to shock front sharpening for building an analytical theory of pressure attenuation in STS sample of microscale thickness, and a new shock Hugoniot data is provided from the laser-based shock experiment using such samples.

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Jack Yoh
Seoul National University

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