Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

The initial response of energetic materials to femto-second indirect laser heating NHAN DANG, JENNIFER GOTTFRIED, FRANK DE LUCIA, Army Research Laboratory, USA — In this presentation, we show the capability of monitoring the initial evolution of heat transfer from femto-second laser-heated metal layers into thin films of solid explosives using time-resolved visible transient absorption (TA) spectroscopy. Reported here are visible TA data in the spectral region from 500 to 750 nm for indirect laser-heated, 5 micron thick films composed of cyclotrimethylene trinitramine (RDX), oxidized polyethylene (OPE), and RDX with 1, 2.5, 5 or 10% OPE prior to decomposition. It was found that the heat generated by a 35 fs laser pulse with an energy density of 15 mJ cm^{-2} on a 100 nm thick Au layer was transferred into the thin film of RDX and was sufficient to induce changes in the electronic structure of RDX molecules, and that the heat transfer rate in RDX depends on its homogeneity and degree of purity. Also in this presentation, investigations of the temperature at metal surfaces (Au, Pt), and the temperature transferred from the metal surfaces into the samples will be discussed. TA of energetic materials induced by different temperature regimes will be reported.

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Date submitted: 02 Mar 2017 Electronic form version 1.4