Abstract Submitted
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The Correlation of Electrical Fields and Detonator Behavior[1] ZAKARY WILDE, ELIZABETH FRANCOIS, JOHN GIBSON, RYLIE LODES, TEAGAN NAKAMOTO, KRISTINA PARRACK, DALTON SMITH, DOUGLAS TASKER, CHRISTOPHER TRUJILLO, Los Alamos National Laboratory — It is well established that behavior of the shock is affected by the microstructure of the explosive. Diagnostics are being developed to utilize Polyvinylidene fluoride (PVDF) gauges for shock wave detection and observing transient electric fields generated by shocked Pentaerythritol Tetranitrate (PETN), which is a piezoelectric explosive. This study has the goal of determining whether PVDF gauges can detect the electrical signature generated by the shock compression of PETN crystals and correlate it with the explosive material microstructure and shock to detonation transition (SDT) process in slapper detonators. Slapper detonators function by inputting current to an exploding foil initiator. The metal foil converts to a plasma causing a thin polymer layer to separate at high velocity and impact the explosive resulting in the SDT. Experiments will observe correlations between changes in the electrical signals and explosive microstructure.

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