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**Time-Resolved Temperature Measurements of Shock Initiation in Heterogeneous Exothermic Mixtures** FRANCOIS-XAVIER JETTE, SAM GOROSHIN, ANDREW HIGGINS, DAVID FROST, McGill University, JULIAN LEE, DRDC-Suffield — Because the onset of reaction in shock-initiated exothermic powder compositions is difficult to observe, few dynamic measurements that could provide information about the initiation delay or the reaction mechanism have been reported. A method has been developed to experimentally measure the delay between the time of shock arrival and the time when most of the reactions have taken place using embedded thermocouples. The powder mixtures used in the tests were Ni-Al, Mn-S, Ti-Si, Ti-C and Ti-B. The test samples were placed in planar recovery ampoules containing thermocouples and a strong shock was delivered via the detonation of an explosive charge. A sharp temperature rise was measured, providing a reliable measurement of the time at which an exothermic reaction had occurred in the bulk mixture. The delay time before the temperature rise provided an upper bound of the initiation delay time, as well as information regarding the reaction mechanism. The results for all mixtures tested showed that bulk temperature starts to rise 10's of milliseconds after the mixture was shocked, which indicates that most of the reaction did not take place on the microsecond timescale.

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