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Physical and Electrical Measurements of Different Metals used in Exploding Wires COLE VALANCIUS, JOE BAINBRIDGE, CODY LOVE, DUANE RICHARDSON, Sandia Natl Labs — Implementation of the energy density metric has made it possible to better understand the physics of exploding wires. When applying the energy density metric to exploding wire experiments in a porous material bed, results suggest a link between characteristics of wire materials (e.g. their electrical properties during burst and the physical work done by the bursting wire). Previous work has focused on qualitative comparisons of current and voltage waveforms and the qualitative comparison of Schlieren images of wire shocks in air. In these experiments, the wires were all buried in a porous media allowing the simultaneous capture of accurate current and voltage to observe the energy density at burst, while simultaneously observing the amount of time the wire took to compress the porous media to a 1 mm deep crater. Observing the physical compression of the porous bed in time in concert with the energy density allows a link to be established between the measured electrical signals and the physical work done by the exploding wire. This research allows a more quantitative link to be established between the electrical energy and the physical energy expended by an exploding wire, allowing for the development of more accurate models and a better understanding of exploding wire physics.

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