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Pressure discharge characteristics in the nanoenergetic systems with hydroxides TYLER TREVINO, MKHITAR HOBOSYAN, KAREN MARTIROSYAN, University of Texas at Brownsville — The growing demand on energetic materials created a new branch of nanotechnology which utilizes the methods of synthesis and characterization of nano-sized particles to produce so called Nanoenergetic Gas-Generators (NGG), which are alternatives to traditional energetic materials including pyrotechnics, propellants, primers and solid fuels. The thermite systems are pyrotechnic mixtures of metal powders and metal oxides that generate an exothermic oxidation-reduction reaction, releasing large amounts of energy at extremely high temperatures. The intimate contact significantly enhances and gives the ability to build an energetic material in molecular level, which is crucial for the pressure discharge efficiency of nano-thermites. The DTA-TGA, Zeta-size analysis and FTIR technique were performed to characterize the Bi(OH)3 particles. The self-assembly of Aluminum and Bi(OH)3 was conducted in sonic bath with appropriate solvents and linkers. The resultant thermite pressure discharge values were tested in modified Parr reactor. Overall, the self-assembled thermites give much higher-pressure discharge values than the thermites prepared with conventional roll-mixing technique.

Tyler Trevino
University of Texas at Brownsville

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