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**Synthesis and Reactive Characterization of Aluminum Iodate Hexahydrate Crystals**[1] DYLAN SMITH, MICHELLE PANTOYA, Texas Tech University — A monomolecular aluminum based explosive crystal has been synthesized from aluminum particles dissolved in iodic acid solution. The precipitate from solution is aluminum iodate hexahydrate ($Al(IO_3)_3(HIO_3)_2(H_2O)_6$), as confirmed by X-ray diffraction (XRD) analysis. The method of synthesis first dissolves iodine oxide in water, creating an $IO_3^-$ solution with pH <0.2. Aluminum nanoparticles are then added to the $IO_3^-$ solution and solid phase aluminum iodate hexahydrate (AIH) crystals precipitate. The bulk density of the crystalline AIH and Al composite is dependent on the initial water to aluminum concentration ratio during synthesis. Reactivity is characterized in terms of flame speed with measurements purposefully designed to capture less than 1% light emission, resulting in speeds as high as 3200 m/s for AIH + Al density of 3.43 g/cc.

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