

THREAT AGENT DEFEAT MODELING AND TESTING USING WMD SIMULANTS

Development Of A System To Comprehensively Characterize Gas Forming Reaction Threats

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Noxious gas forming reactions between solid substrates and liquids remain a concern to joint forces, requiring characterization as well as modeling and simulation. A robust, consistent testing methodology is necessary to generate the data for the development of semi-empirical models with a foundation upon which the threat of these reactions can be characterized. To that end, the Counter-Improvised Threat Team at Naval Surface Warfare Center (NSWC) Indian Head Division has developed a solution to safely capture data from gas formation reactions and quantify a wide variety of materials of interest.

Our solution integrates multiple concurrent measurement techniques to determine the rate of reaction, thermal changes in the reaction mixture, total quantity of gas generated, and the reaction efficiency. This measurement suite is contained in a custom-designed sealed vessel that provides protection to the operators. This apparatus has provided valuable data to a variety of modeling groups across the defense enterprise and can be used across a range scales, from 2 grams to 500 grams, relevant for the modeling community. This work provides the ground truth to a variety of hazardous chemical reactions at varying scales and can be rapidly augmented for a range of reaction conditions based on need.

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