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Combustion Characteristics of Printed Biocidal Formulations¹ FIDEL RUZ-NUGLO, MAYRA MUCI-CASTANEDA, LORI GROVEN, South Dakota School of Mines & Technology — Iodate based biocidal formulations are traditionally plagued by aging and degradation of the iodate and/or the aluminum, which in turn reduces their efficacy. It would be ideal if we could apply these formulations to surfaces, devices, or the like, rather than working with loose reactive powders. In this effort, fluoropolymers were selected as i) the protective agent for both the iodates and the aluminum within the formulations, and ii) as the polymer for development of a printable biocidal. This study examines the effectiveness of the fluoropolymer in terms of protecting the respective iodates under accelerated aging conditions (70 °C, 30% RH) and the combustion characteristics of printed traces. Simultaneous differential scanning calorimetry (DSC) and thermogravimetric (TG) analyses were performed to elucidate the complex interactions between the flouropolymers, iodates, and aluminum. Printable formulations were made with varying polymer content and printed using a pen-type deposition system. The combustion characteristics are presented as a function of polymer loading and print dimension. The necessary rheological characteristics and the associated safety characteristics of the printed formulations will also be detailed.

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