

One-flow Upscaling Neutralization of Organophosphonate derived Pesticide/Nerve Agent Simulant to Value-Added-Chemicals in Novel Teflon Microreactor Platform

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Synthesizing value-added products from chemical warfare agents is a concept well beyond the usual notion of simply neutralizing the agents. We put to practice here such a concept in converting paraoxon, a nerve agent simulant to paracetamol, an active pharmaceutical ingredient (API). A portable and compact platform consisting of configurable modules based on robust Teflon plate microreactors (TPMs) is devised for neutralization of paraoxon as well as consecutive three-step synthesis of paracetamol in one-flow manner. Numbered-up TPM platform enables kilogram-scale detoxification of paraoxon within 1.5 min of processing time at a rate of 62.5 g/h (1.5 kg/day), while another platform in small but configurable footage delivers the API in one-flow at the pre-optimized conditions on the three-step chemistry established by a capillary reactor. Portability and robust nature of the platform makes it suitable for its transport and on-site use on a large scale at military installation as well as in the chemical industry.