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Characterization Of A Continuous Neutralization For The Chemical Warfare Agents By A Flow Reactor

Lim Ji Won Agency for Defense Development **Jihyun Kwon** Agency for Defense Development **Na Yeong Ko** Agency for Defense Development
Hyun Suk Kim Agency for Defense Development

A characterization of a continuous neutralization for the chemical warfare agents by a flow reactor

Ji Won Lim, Jihyun Kwon, Na Yeong Ko, Hyun Suk Kim
Chem-Bio Technology Center, Agency for Defense Development, Daejeon, Republic of Korea

The disposal of chemical warfare agent(CWA) in the aging ammunitions can be achieved with various technologies including the explosive destruction system and the drilling of ammunitions with the agent transfer system. In the case of drilling and transferring the CWA, the transferred CWA should be simultaneously processed with the neutralization to dispose of, because exposure to a massive amount of CWA can be dangerous for military field operations.

For such an onsite neutralization process, a flow chemistry technology can be the alternative with faster, safer, and continuous chemical reactions at various scales. Flow chemical reaction mixture of the neutralized CWA provides safety and economic benefits as small amounts of valuable catalysts, reagents, or reducing the system size. Also, a computer-controlled flow reactor has the potential to provide a high level of automation for the chemical neutralization system for field operation.

The purpose of this study is to compare the neutralization reaction for CWA(e.g. GD; also known as nerve agent 'Soman') and its simulant (DECP; diethyl chlorophosphate) between the flow chemistry reaction method and conventional experimental tools. The neutralization efficiency and other parameter optimizations have been analyzed not only by gas chromatography but also FT-IR spectrum analysis. We investigated this flow chemistry reaction for the neutralization of CWA by its parameter optimization study as well as the characterization of the neutralized products from CWA.