

The effects of surfactant and polymer on the size and morphology of HMX particles obtained by combined cooling and anti-solvent crystallization

Anku Kingsley Etornam, 김광주^{1,†}

Hanbat National University; ¹한밭대학교

(kjkim@hanbat.ac.kr[†])

Material properties, such as the packing density and their sensitivity of explosives materials are influenced by the size and shape of the crystals, thus, the peaked interest in engineering the size and morphology of explosives. Surfactants and polymers influence either the growth or the nucleation phase by various mechanism, resulting in the modification of either the polymorphic form or the crystal habit. An attempt has been made to develop microcrystals of β -HMX by applying a combined cooling and anti-solvent crystallization technique in the presence of surfactants, and polymers. An inert polymer polyvinyl pyrrolidone (PVP), an anionic surfactant sodium lauryl sulphate (SLS) and an ionic surfactant sorbitan monooleate (Span 80) were studied to observe their effect on particle size and morphology at different cooling temperature. Characterization of the crystals were by particle size distribution, optical and scanning electron microscopy. The induction time; based on the first visual observation of haziness in the HMX solution was noted.