

Crystallization of HMX and RDX using supercritical CO₂ as antisolvent

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Explosives dissolved in various solvents were recrystallized successfully by adding sc-CO₂ as an antisolvent. In this study, ASES (Aerosol Solvent Extraction System) process was used to prepare submicron HMX and RDX particles with enhanced performance and insensitivity. The recrystallized HMX and RDX particles were characterized by SEM, PSA, XRD, FT-IR and DSC. Depending on the solvent, such as cyclohexanone, DMSO, acetone, acetonitrile, DMF, ethyl acetate, NMP and γ -butyrolactone, the recrystallized explosive particles showed a variety of morphologies, such as a hexagonal plate, irregular shredded paper, gravel cover with yarn, gravel, pebbles, etc. The mean particle size of the recrystallized HMX and RDX ranged from 3 to 50 μm , and crystallinity of the recrystallized HMX and RDX particles decreased. The recrystallized HMX was transformed into γ or δ -HMX from β -HMX while RDX did not show any phase changes.