Recrystallization of HMX by GAS process

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The performance and sensitivity of explosive particles are known to be dependant upon the particle properties such as morphology, size, and size distribution of the particles. Hence, various attempts have been made to control the particle properties mentioned above. Supercritical Fluid Particle formation processes such as SAS (Supercritical Anti-Solvent), GAS (Gas Anti-Solvent), and RESS (Rapid Expansion of Supercritical Solution) are relatively new methods developed for the purpose of producing micro- or nanoparticles. These technologies have been applied in the field of explosive particles production with the advantage that the physical properties of the supercritical anti-solvent which can be changed by simple compression or expansion, can also change the properties of the particles produced.

GAS process can be used to recrystallize the explosive cyclotetramethylenetetranitramine, also known as HMX. HMX has four different polymorphs among which the β-form is favored for its highest density and lowest sensitivity. In this work, parameters affecting the morphology, size, and yield of the particles and their effects are investigated.