Precipitation of high energetic materials by supercritical anti-solvent process



Our research aims to find out the particle size and morphology of RDX and HMX which were prepared by supercritical anti-solvent process. Depending on the powder particles, smaller particles are generally known to be insensitive. 1). And also spherical shape particle has lowest shock sensitivity among other shapes particles. RDX and HMX are used as percussion because they have high shock sensitivity and adjusted to initiate the explosion. Also high shock sensitivity can make unintentional explosion, which can be disaster accidents. We used supercritical anti-solvent process. Supercritical carbon dioxide was used as anti-solvent in the system RDX or HMX was dissolved in organic solvent, acetone. Then, the solution was sprayed into supercritical carbon dioxide. As the organic solvent lost its solvent power, RDX, HMX particles would be precipitated. Since the supersaturation of this process was higher than any other processes, micro to nano particles can be obtained. We changed the operation pressure, temperature and solution concentration. For particle size and shape, we used Field Emission Scanning Electron Microscopy (FE -SEM) and for morphology of the particles, we used X-Ray Diffraction (XRD).