

### Design of Gas Antisolvent Recrystallization process

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This work studies design of gas antisolvent recrystallization process of cyclotetramethylenetetranitramine (HMX). HMX is a powerful and relatively insensitive explosive which used in various industrial application. Since its particle size and shape are important properties for explosive materials, there have been many trials to control those properties. Gas antisolvent process with supercritical carbon dioxide as an antisolvent is much safer than traditional methods and can produce particles with required shape and size distribution.

This process is relatively new and its design for plant operation have not been not studied. This work can provide base design for gas antisolvent process by uniting conventional chemical process design with a mathematical model of gas antisolvent process. Particle size distribution of recrystallized HMX can be obtained. Separation and recycling process can be designed and optimized from the results of recrystallization. Yield of desired product after separation can be calculated from particle size distribution results. Optimal operating points for separation and recycle can be obtained from this integrated work.