

## Preparation of Micro-nano TATB by High-pressure and Ultrasonic Breaking Method

ZENG Gui-yu, LIU Chun, ZHAO Lin, QIN De-xin

(Institute of Chemical Materials, CAEP, Mianyang 621999, China)

**Abstract:** To explore the application of high-pressure and ultrasonic breaking method in micro-nano TATB preparation, the wet breaking of TATB particles was performed by a nano-machine. The working principle of high-pressure and ultrasonic breaking method was introduced. The effects of breaking pressure, TATB concentration, surfactant and breaking times on the mean particle size and surface area of micro-nano TATB were studied. The change of morphology and thermal performance of TATB particle before and after breaking was compared. Results show that the mean particle size of TATB reduces and its specific surface area enhances with increasing the breaking pressure. The mean particle size reduces first and then enhances when TATB concentration increase. Both sodium dodecyl benzene sulfonate and polyoxyethylene octyl phenyl ethers (OP) have preventing congregation effect for micro-nano TATB particles, but OP has a better effect. The mean particle size reduces first and then increases with the breaking times enhance. Under the breaking conditions of interval mode, TATB concentration 10%, pressure 100 MPa, OP and breaking 10 times, the product has no notable change for particle morphology compared with original TATB materials but the mean particle size decreases from 18  $\mu\text{m}$  to 530 nm and thermal decomposition temperature reduces from 396.6  $^{\circ}\text{C}$  to 392.1  $^{\circ}\text{C}$ .

**Key words:** high-pressure and ultrasonic breaking; particle size; thermal performance; micro-nano; TATB

**CLC number:** TJ55; TQ56

**Document code:** A

**DOI:** 10.11943/j.issn.1006-9941.2015.08.007



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