

**X-RAY DIFFRACTOMETRY STUDIES ON
5-AMINOTETRAZOLE-Fe₂O₃-KNO₃ SYSTEM**

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5-aminotetrazole (5AT) is a potential propellant material for gas generators and other systems. Pure 5AT melts at approximately 205°C with no solid-state phase transitions. Differential scanning calorimetric (DSC) data showed that the propellant 5AT mixed with Fe₂O₃ and KNO₃ has a solid-state transition at 129°C, which has been confirmed by above ambient X-ray diffraction analyses. This is the KN II → KN I phase transition, where KN II and KNI are low and high temperature KNO₃ phases, respectively. DSC data also showed another energetic endotherm at 175°C, and we observed that the X-ray diffraction data showed absence of 5AT peaks at 180°C, confirming the DSC data. X-ray data also showed KN I and γ-Fe₂O₃ Bragg peaks. This indicates that either a new amorphous compound has formed or there is decomposition of 5AT. At slightly higher temperature above 175°C, DTA-FTIR analyses showed that hydrozoic and hydrocyanic acids are formed. X-ray diffractometry and differential scanning calorimetry studies are also performed on the pure 5AT. Details of lattice expansions for pure 5AT, phase transitions in 5AT-Fe₂O₃-KNO₃ system will be presented.