

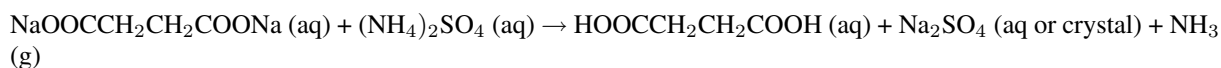


Cooperativity between Volatilization of NH₃, Evaporation of Water and Crystallization of Na₂SO₄ in Internally Mixed Sodium Succinate/Ammonium Sulfate Aerosols

Pan Wang, Shu-Feng Pang, and Yun-Hong Zhang

School of Chemistry and Chemical Engineering, Beijing Institute of Technology, Beijing, China(yhz@bit.edu.cn)

Gas-to-particle partitioning is one of the most important physicochemical process in atmospheric aerosols. The chemical reaction in the internally mixed organic/inorganic aerosols attracts much attention on the volatility and hygroscopicity. In this study, FTIR spectra evolution with time were observed by FTIR-ATR technique at constant relative humidity for the internally mixed sodium succinate/ammonium sulfate aerosols with molar ratio of 1:1. The results showed that sodium succinate and ammonium sulfate in the mixed aerosols could react to form succinate acid and sodium sulfate accompanying NH₃ volatile as followings:



The volatilization of NH₃ speeded up the evaporation of water, and indirectly accelerated the crystallization of Na₂SO₄ in the mixed aerosols, which synergistically accelerated release of NH₃. The complex reaction between dicarboxylic salt and (NH₄)₂SO₄ could help us to understand the cooperativity between the gas-to-particle equilibrium, phase transition, atmospheric composition and volatility, which could reveal the formation mechanism of the secondary organic aerosols.