

Kinetic studies for the formation of ammonia borane

이대형^{1,2}, 김유중¹, 김영천¹, 남석우^{1,2}, 윤창원^{1,2,*}

¹한국과학기술연구원; ²과학기술연합대학원대학교
(cwyoon@kist.re.kr*)

Owing to its high hydrogen capacity (ca. 19.6 wt%), ammonia borane (AB) has recognized as a promising chemical hydrogen storage material for fuel cell applications. Due to the lack of an efficient large-scale preparation method, however, this material has not been widely utilized for this propose. In this context, we have been developing a safe, economical, and continuous synthetic process for AB by initially reacting BH₃·THF with NH₃ under inert atmosphere. Initial rates of these reactions were analyzed to elucidate the kinetic behavior of the AB formation, and controlling factors for the desired reactions were identified. The resulting solid products were further characterized by ¹¹B NMR spectroscopy. Potential large-scale processes for AB synthesis were proposed, based on the experimental results and simulation.