

尿素催化水解性能评价试验研究 【上架时间： 2023-03-30】



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分类	:	论文		
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## 详细信息

【标题】尿素催化水解性能评价试验研究

【Title】Experimental study on catalytic hydrolysis performance of urea

【摘要】为优化尿素水解制氨工艺中水解反应的反应速率，本文针对几种常用的尿素水解催化剂，在间歇反应系统和中试试验台上进行对比试验。结果表明：添加磷酸氢二铵或氧化铝均比无催化剂时的尿素分解率高，水解反应活化能依次为：73.6 kJ/mol、65.3 kJ/mol、52.9 kJ/mol，添加催化剂有效降低了水解反应活化能，提高了尿素的分解速率，且催化水解气相产物的各组分体积浓度与无催化时的结果一致；在140℃、150 kPa试验条件下，催化剂循环使用5次后活性保持稳定，反应温度较高时的液相尿素溶液浓度较小；中试试验时固体氧化铝分布不均，在相同产氨量下的反应液温度高于磷酸氢二铵

【Abstract】In order to optimize the reaction rate of urea hydrolysis to ammonia, several commonly used urea hydrolysis catalysts were compared and tested in batch reaction system and pilot test bench. The results show that the decomposition rate of urea with diammonium hydrogen phosphate or alumina is higher than that without catalyst, and the activation energy is in the order of: 73.6 kJ/mol, 65.3 kJ/mol, 52.9 kJ/mol, not only reduce the activation energy of hydrolysis reaction, but also increase the decomposition rate of urea, and the volume concentration of each component of the gas phase product of catalytic hydrolysis is consistent with the result without catalysis. The activity of the catalyst at 140°C and 150 kPa remained stable after five cycles, and the concentration of liquid urea solution was smaller at higher reaction temperature. In the pilot test, due to the uneven distribution of solid alumina, the temperature of the reaction solution is higher than that of diammonium hydrogen phosphate under the same ammonia production.

【关键词】尿素溶液；水解反应；催化剂；动力学；氨气

【Keywords】urea solution; hydrolysis reaction; the catalyst; dynamics; ammonia

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【来源】2022年中国电机工程学会年会论文集

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