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利用温度跃升傅立叶变换红外原位分析技术对斯蒂酚酸碳酰肼和斯蒂酚酸氨基脒快速热解反应的研究

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摘要 利用温度跃升傅立叶变换红外原位分析技术对斯蒂酚酸碳酰肼和斯蒂酚酸氨基脒的快速热分解过程进行了研究。研究表明, 这两种化合物在快速热分解过程中产生十一种气相产物: NO, CO, HCN, H<sub>3</sub>N, NO<sub>2</sub>, N<sub>2</sub>O, HNCO,

HONO, CO<sub>2</sub>, H<sub>2</sub>O和HCHO,

其中NO和CO为主要气体产物。同时得到了快速热分解主要气相产物摩尔分数随时间的变化关系曲线。斯蒂酚酸碳酰肼热分解产生的H<sub>3</sub>N可进一步氧化生成NO<sub>2</sub>, N<sub>2</sub>O和H<sub>2</sub>O。大量氧化还原气体和毒性气体的存在致使这两种化合物不适于作为环境友好起爆药和气体发生剂组分。

关键词 [斯蒂酚酸, 碳酰肼, 氨基脒, 温度跃升傅立叶变换红外光谱, 快速热分解](#)

分类号

**Flash Pyrolysis Study of M<sub>2</sub>TNR (M: Carbohydrazide or Semicarbazide) by T-jump/FTIR Spectroscopy**

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**Abstract** Flash pyrolysis of (CHZ)<sub>2</sub>TNR and (SCZ)<sub>2</sub>TNR was conducted by T-jump/FTIR spectroscopy under 0.1 MPa Ar atmosphere. The results show that eleven IR-active gas products obtained during flash pyrolysis process of the two title compounds are NO, CO, HCN, NH<sub>3</sub>, NO<sub>2</sub>, N<sub>2</sub>O, HNCO, HNO<sub>2</sub>, CO<sub>2</sub>, H<sub>2</sub>O and HCHO, of which NO and CO are the main gas products. The molar fraction of the individual product in the pyrolysis gas mixture was described as a function of time. At least some of the NO<sub>2</sub>, N<sub>2</sub>O and H<sub>2</sub>O can result from the oxidization reaction of NH<sub>3</sub> during flash pyrolysis of (CHZ)<sub>2</sub>TNR. It can be concluded that the two compounds are not worthy of further in-depth consideration of the adoption in detonators as eco-friendly primary explosive, and should not be used as gas generation composition of automobile crash airbag system taking into account the toxicity.

**Key words** [2, 4, 6-trinitroresorcinol](#) [carbohydrazide](#) [semicarbazide](#) [T-jump/FTIR](#) [flash pyrolysis](#)

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