

[1]郝嘎子,刘杰,刘环环,等.纳米CuCr<sub>2</sub>O<sub>4</sub>的制备及其对AP热分解性能的影响[J].火炸药学报,2015,38(1):26-29.

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## 纳米CuCr<sub>2</sub>O<sub>4</sub>的制备及其对AP热分解性能的影响

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**Title:** Preparation of Nano-sized Copper Chromite and Its Effect on Thermal Decomposition Performances of Ammonium Perchlorate

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**关键词:** 物理化学; 纳米CuCr<sub>2</sub>O<sub>4</sub>; AP; 热分解; 催化效果; 固体火箭推进剂

**Keywords:** physical chemistry; nano-sized copper chromite; AP; thermal decomposition; catalytic effects; solid rocket propellants

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**摘要:** 采用HLG-5型纳米化粉碎机制备了粒径约为60nm的纳米CuCr<sub>2</sub>O<sub>4</sub>,用X射线衍射仪(XRD)、透射电子显微镜(TEM)表征了样品的结构及形貌,分析了纳米CuCr<sub>2</sub>O<sub>4</sub>的形成机理,用差示扫描量热仪(DSC)研究了原料CuCr<sub>2</sub>O<sub>4</sub>和纳米CuCr<sub>2</sub>O<sub>4</sub>对AP热分解性能的影响。结果表明,与原料CuCr<sub>2</sub>O<sub>4</sub>相比,质量分数2%的纳米CuCr<sub>2</sub>O<sub>4</sub>对AP具有更好的催化性能,可使AP的低温分解峰减弱,高温分解峰温降低67℃,反应速率常数提高数倍,使AP的表观分解热从821J/g提高到1393J/g,增长率为69.7%。

**Abstract:** Nano sized CuCr<sub>2</sub>O<sub>4</sub> (copper chromite) with particle size of about 60nm was prepared via a HLG-5 type nanometer grinder. The structure and morphology of the samples were characterized by a X-ray diffractometer (XRD) and transmission electron microscopy(TEM). The formation mechanism of the nano CuCr<sub>2</sub>O<sub>4</sub> was analyzed. The catalytic effects of raw CuCr<sub>2</sub>O<sub>4</sub> and nano CuCr<sub>2</sub>O<sub>4</sub> on thermal decomposition performances of AP were investigate by DSC. Results show that compared with raw CuCr<sub>2</sub>O<sub>4</sub>, the nano CuCr<sub>2</sub>O<sub>4</sub> with a mass fraction of 2% shows best catalytic property to AP, it can make the low temperature decomposition peak of AP weaken, and the peak temperature of high temperature decomposition decrease by 67 °C, the reaction rate constant increase by several times, and the apparent decomposition heat of AP enhance from 821 J/g to 1393J/g with a growth rate of 69.7%.

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**备注/Memo:** -

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