

- 2010, 366(1-3): 197-202.
- [26] Zhu J, Bi H, Wang Y, et al. CuO nanocrystals with controllable shapes grown from solution without any surfactants[J]. *Materials Chemistry & Physics*, 2008, 109(1): 34-38.
- [27] Vargeese A A, Muralidharan K. Kinetics and mechanism of hydrothermally prepared copper oxide nanorod catalyzed decomposition of ammonium nitrate[J]. *Applied Catalysis A General*, 2012, 447-448(24): 171-177.
- [28] Li N, Cao M, Wu Q, et al. A facile one-step method to produce Ni/graphene nanocomposites and their application to the thermal decomposition of ammonium perchlorate[J]. *Cryteng-comm*, 2011, 14(2): 428-434.
- [29] Zeng L, Zhu J. The Effects of preparation methods on the crystal phase and specific surface area of VPO catalysts[J]. *Journal of Molecular Catalysis*, 2003, 17(5): 367-370.
- [30] Ramakrishna A, Murali N, Margarette S J, et al. Studies on structural, magnetic, and DC electrical resistivity properties of $\text{Co}_{0.5}\text{M}_{0.37}\text{Cu}_{0.13}\text{Fe}_2\text{O}_4$ (M=Ni, Zn and Mg) ferrite nanoparticle systems[J]. *Advanced Powder Technology*, 2018, 29: 2601-2607.
- [31] 陈彦,张济宇. NaCO_3 催化剂对福建高变质无烟煤比表面及气化反应特性的影响[J]. *化工学报*, 2011, 62(10): 768-2775.
- CHEN Yan, ZHANG Ji-yu. Effects of catalyst loading of NaCO_3 on specific surface area and gasification characteristics of Fujina high-metamorphous anthracite [J]. *CIESC Journal*, 2011, 62(10): 2768-2775.

Preparation of CuO/PG Nanocomposites and Their Effect on the Catalytic Decomposition Performance of AP

DONG Hao-xue, LI Guo-ping, ZHANG Chen-hui, LUO Yun-jun

(School of Materials and Science, Beijing Institute of Technology, Beijing 100081)

Abstract: To improve the catalytic effect of nano-CuO, the CuO/PG nanocomposites of CuO morphology as flakes, lines, rods and spheres were prepared by complex precipitation method using porous graphene (PG) as carrier. The effect of CuO/PG nanocomposites on the thermal decomposition of ammonium perchlorate (AP) was investigated by DSC and its catalytic mechanism was analyzed. Results show that compared with the nano-CuO with the same morphology, the CuO/PG nanocomposites have larger specific surface area and better catalytic effect on the thermal decomposition of AP. Among four kinds of CuO/PG nanocomposites, the spherical copper oxide has the smallest particle size, about 4 nm and the specific surface area of the composite is the largest, about $115.25 \text{ m}^2 \cdot \text{g}^{-1}$. Therefore, it has the most active catalytic sites and the best catalytic effect on the thermal decomposition of AP, so that the high temperature exothermic decomposition peak temperature of AP decreases to $310.1 \text{ }^\circ\text{C}$.

Key words: porous graphene; complex precipitation method; CuO / PG nanocomposites; ammonium perchlorate; catalysis; decomposition

CLC number: TJ55; TB333; O614.12

Document code: A

DOI: 10.11943/CJEM2018258



《含能材料》“观点”征稿

为了丰富学术交流形式,及时传递含能材料领域同行们的学术观点和思想,《含能材料》开设了“观点”栏目。“观点”栏目的来稿应观点鲜明、内容新颖、形式上短小精悍。欢迎含能材料各领域的专家积极来稿。来稿时请附个人简介及主要研究工作介绍。

《含能材料》编辑部