2005年第1期 总第26期(卷) 文章来源：华中科技大学 材料学院 模具技术国家重点实验室， 湖北 武汉 430074|State Key Laboratory of Plastic Forming Simulation and Die and Mould Technology , Department of Materials Science

纳米铝粉在固体推进剂中的应用进展

2005-3-17 9:38:13 中国兵工学会

摘要: 介绍金属纳米铝粉的制备方法，综述了用于固体推进剂的纳米铝粉的突出效应，例如燃烧完全、提高推进剂燃烧速率、降低压强指数等，阐述其在固体推进剂中可能的作用机理，分析应用中存在的问题，并提出了可行的解决措施。

关键词: 含能材料； 纳米铝粉； 固体推进剂； 制备
中图分类号: TJ763

参考文献:

［1］李葆萱, 王克秀. 固体推进剂性能［M］． 西安: 西北工业大学出版社, 1990: 16-19.
［2］李疏芬, 金乐骥. 铝粉粒度对含铝推进剂燃烧特性的影响［J］． 含能材料, 1996, 4(2): 68-74.
［3］张立德, 牟季美. 纳米材料学［M］． 沈阳: 辽宁科学技术出版社, 1994: 3-24.
［4］张立德, 超微粉体制备与应用技术［M］． 北京: 中国石化出版社, 2001: 103-113.
［5］Linderoth S, Pedersen M S. Fe Al 2O 3 Nanocomposites prepared by high energy ball milling［J］． Appl Phys, 1994, 75(10): 5867-5869.
［6］张立德, 牟季美. 纳米材料和纳米结构［M］． 北京: 科学出版社, 2001： 112-138.
［7］Yadong L, Yitai Q. A reduction pyrolysis catalysis synthesis of diamond［J］． Science, 1998, 281(10): 246-247.
［8］刘吉平, 郝向阳. 纳米科学与技术［M］． 北京: 科学出版社, 2002：19-40.
［9］Internet WEB Site: Argonide Nanometal Technologies. http: ‖ www.argonide.com.
［10］Internet WEB Site:Tetronics Ltd.http: ‖ www.tetronics.com.
［11］Internet WEB Site: Tekna Plasma Systems Inc. http: ‖ www.tekna.qc.ca.
［12］Baschung B, Grune D, Licht H H, Samirant M. Combustion of Energetic Materials［M］. Newyork:Begell House Inc, 2002: 219-225.
［13］Mench M M， Yeh C L, Kuo K K. Propellant burning rate enhancement thermal behavior of ultrafine aluminum powders(Alex)［C］‖29th International Annual Conference of ICT. Karlsruhe, Germany. 1998:30.1-30.15.
［14］Mordosky J W, Zhang B Q, Harting G C, et al. Combustion of Energetic Materials［R］. Newyork:begell House Inc., 2002: 206-218.
［15］邓康清, 王光天, 王桂兰. 超细铝粉的燃烧特性及燃烧模型［J］. 固体火箭技术, 1996, 19(1): 28-37.
［16］王桂兰, 李疏粉, 夏强, 赵秀媛. 超细铝粉燃烧性能研究［J］. 兵工学报：火化工分册, 1996, (2): 24-26.
［17］朱济, 李疏芬. 铝粉的辐射热反馈及对固体推进剂压强指数的影响［J］. 固体火箭技术, 1998, 21(1): 31-33.
［18］夏强, 李疏芬, 王桂兰, 金乐骥, 赵秀媛. 超细铝粉在AP/HTPB推进剂中的燃烧研究［J］. 固体火箭技术, 1994, (4): 35-42.
［19］谢剑宏. 纳米铝粉燃烧残余物的粒度分析［J］. 湖北航天科技, 2002，(5): 40-43.
［20］Fang Chong, Li Shufen. Experimental research of the effects of superfine aluminum powders on the combustion characteristics of nepe propellants［J］. Propellants, Explosives, Pyrotechnics, 2002, 27(1): 34-38.
［21］Young Soon Kwona, Alexander A Gromovb, Alexander P Ilyinb, et al. The mechanism of combustion of superfine aluminum powders［J］. Combustion And Flame, 2003，133(4): 385-391.
［22］Mench M M, Kuo K K, Yeh C L, et al. Comparison of thermal behavior of regular and ultra fine aluminum powders (Alex) made from plasma explosion process［J］. Combustion Science and Technology, 1998,135(1): 269-292.
［23］Patrick Brousseau, C John Anderson. Nanometric aluminum in explosives［J］. Propellants, Explosives, Pyrotechnics, 2002,27(5): 300-306.
［24］Queenie S M Kwok, Robert C Fouchard, Anne Marie Turcotte, et al. Characterization of aluminum nanopowder compositions［J］. Propellants, Explosives, Pyrotechnics, 2002,27(4): 229-240.
［25］David E G Jones,Richard Turcotte,Robert C,Fouchard,Queenie S M Kwok,Anne Marie Turcotte, Zainab Abdel Qader. Hazard characterization of aluminum nanopowder compositions［J］. Propellants, Explosives, Pyrotechnics, 2003, 28(3):120-131.
［26］Frank Caruso. Nanoengieering of particle surfaces［J］. Advanced materials, 2001, 13(1): 11-22.

Progress in the Application of Nano Aluminum Powder in Solid Propellants

LI Ying, SONG Wu_lin, XIE Chang_sheng, WANG Ai_hua, ZENG Da_wen

State Key Laboratory of Plastic Forming Simulation and Die and Mould Technology , Department of Materials Science

Abstract: Fabrication of metal nano powders was introduced, and their function as well as the mechanism of action of nano aluminum powders in solid propellants was summarized. Notable effects of nano aluminum when used in solid propellants, such as more efficient combustion, prevention from agglomeration, increase in propellant's burning rate etc were described. Furthermore, problems in the application of nano aluminum and corresponding measures were also discussed.
Key Words: energetic material; nano aluminum; solid propellant

发布人:sy
发布时间:2005年3月17日
共有1766位读者阅读过此文

- 上篇文章：磨削硬齿面插齿刀波形前刀面用凸轮设计、制造方法
- 下篇文章：黑索今粒度及粒度级配对高分子粘结炸药冲击波感度的影响

□- 本周热门文章

1.黑索今粒度及粒度级配对高分子粘结炸药...[]

□- 相关文章 无

关于我们 | 联系我们 | 网站声明 | 经营业务 | 相关链接 | 使用帮助

中国兵工学会 版权所有 2003-2004

Copyright All Reserved by China Ordnance Society. 2003-2004