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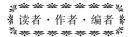
## Validation of Energy Transfer and Continuum Heat Transfer Model for the SCB Plasma

FENG Hong-yan, ZHU Shun-guan, ZHANG Lin, LI Yan, SHEN Rui-qi

(School of Chemical Engineering, Nanjing University of Science and Technology, Nanjing 210094, China)

Abstract: The energy transfer mechanism between semiconductor bridge (SCB) plasma and the explosives was studied. The possible energy effect forms were mentioned and discussed by the mode of capacitor discharge. Some special ignition tests were designed and carried out to validate some energy transfer mechanisms including the thermal conduction between SCB and the explosive material, SCB plasma shock effect and permeability heat effect. A continuum model was developed to analyze the heat transfer from SCB plasma to explosive particles. The spherical heat transfer models of three primary explosive particles lead styphnate(LTNR), nickel hydrazine azide (NHA) and nickel hydrazine nitrate (NHN) were calculated by Fourier analysis and numerical simulation. The minimum ignition voltages of three explosive particles were 11 V, 15 V and 39 V respectively. The ignition tests show that heat transfer coefficients of medicaments affect ignition attributions of SCB. The smaller heat transfer coefficient is, the smaller minimum ignition voltage is. The simulated results show that the permeability heat effect is the main energy effect form in the SCB ignition tests.

Key words: military chemistry and pyrotechnics; SCB plasma ignition; heat transfer model; mechanical shock; primary explosive



## 第十五届欧洲分析化学会议会讯

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欧洲分析化学学术会议是由欧洲分析化学学会主办的面向全球的高水平学术会议,自1972年至今每两年举办一次,第15届欧洲分析化学会议于2009年9月6-11日在奥地利因斯布鲁克举办。本次会议参与协办的是奥地利科技研究发展协会和比利时参考物质和测量研究所,会议主席由奥地利林茨大学的Wolfgang Buchberger 教授和维也纳大学的Wolfgang Lindner 教授担任。会议主题为"分析化学对生活质量的冲击",包括以下内容:先进的快速分析;纳米分析;过程分析技术;样品制备;传感技术;分离技术等。参会人员约千余人,多为欧洲、美国等国家的相关科研人员,亚洲国家人员主要来自日本、韩国两国,中国参会人员三人。会议共包括8个大会报告,三个分会场共125个口头报告,约600余个墙报。大会还代表欧洲分析化学学会对在分析化学领域做出杰出贡献的三位学者进行了颁奖,其中包括EMICH PLAQUE 奖、PREGL 奖和由德国 Springer 颁发的 Robert Kellner 讲演奖。

欧洲分析化学会议代表了全球分析化学领域的最高水平,体现了化学、物理学、材料学、光学等多学科的融合,越来越关注于纳米分析技术、多功能联机系统、分子识别等先进的分析表征技术,同时重视分析化学在生物、食品、反恐、环境中的应用,各知名仪器商和德国 Springer 出版商每年都要随会参展。下一届欧洲分析化学学术会议将于 2011 年 9 月在塞尔维亚召开。

(中国工程物理研究院化工材料研究所 徐涛 供稿)