

Combustion Properties and Thermal Behavior of ETPE gun propellant and RGD7 Nitramine Gun Propellant

ZHAO Ying, LIU Yi, YANG Li-xia, ZHANG Zou-zou

(Xi'an Modern Chemistry Research Institute, Xi'an 710065, China)

Abstract: The combustion properties and thermal behaviors of energetic thermoplastic elastomer (ETPE) gun propellant and RGD7 nitramine gun propellant were studied by the closed bomb test, differential scanning calorimetry (DSC) and scanning electron microscopy (SEM). The results show that in comparison with RGD7 nitramine gun propellant, the ETPE gun propellant has lower burning rate, longer burning time and the burning rate pressure exponent larger than 1, whereas the pressure exponent of RGD7 nitramine gun propellant is less than 1. For RGD7 nitramine gun propellant, the endothermic melting peak of RDX at 204.8 °C in the propellant is inconspicuous and the exothermic decomposition peak of RDX at 240 °C is lag behind the exothermic decomposition peak at 194 °C of the NC/NG, where as the thermal decomposition temperature at 263 °C of poly(BAMO/AMMO) in ETPE gun propellant is higher than the thermal decomposition temperature at 240 °C of RDX. The different combustion properties of two gun propellants are caused by the different thermal behaviour of main compounds in the propellants.

Key words: physical chemistry; 3,3-diazidomethyl oxetane / 3-azidomethyl-3-methyl oxetane (BAMO/AMMO); nitramine gun propellant; combustion properties; pressure exponent; thermal decomposition

CLC number: TJ55; O64

Document code: A

DOI: 10.3969/j.issn.1006-9941.2012.02.011



第九届全国爆炸力学学术会议通知(第一轮)

经中国力学学会批准,第九届全国爆炸力学学术会议计划于2012年7月底在青海省西宁市举行,本次会议由中国力学学会爆炸力学专业委员会主办,中国工程物理研究院流体物理研究所冲击波物理与爆轰物理国防科技重点实验室承办。会议旨在对爆炸力学有关研究领域近年来取得的新进展开展交流和讨论,以便更好地促进本学科的发展。

一、论文范围

- (1) 爆炸驱动与冲击加载技术
- (2) 应力波理论与效应
- (3) 材料本构关系与动态断裂
- (4) 爆炸冲击效应及其应用
- (5) 爆轰学与钝感高威力炸药技术
- (6) 结构动态响应与安全防护
- (7) 冲击吸能与应用
- (8) 爆炸加工与爆破工程
- (9) 爆炸冲击实验与诊断技术
- (10) 爆炸与冲击数值模拟
- (11) 其它爆炸力学问题

二、联系方式

联系人: 王影(0816-2490042,13989285830) 安焕新(0816-2485105,13689678097)

传真: 0816-2485139 E-mail: bzlxhy2012@163.com 通信地址: 四川绵阳 919 信箱 110 分箱, 621900

中国力学学会爆炸力学专业委员会
中物院流体物理研究所冲击波物理与爆轰物理实验室
2011年12月