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Adjustment of Oxygen Balance for Single-base Propellant

Lü Zhi-xing, HE Zeng-di, XIAO Zhong-liang, ZHENG Dong-sheng, ZHONG Jian-hua

(Department of Chemical Engineering and Environment, North University of China, Taiyuan 030051, China)

Abstract: Methods of increasing the oxygen balance of single-base propellant were studied. The oxygen balance, flame temperature, explosion heat, specific energy and gas component were calculated by the minimum free energy method. The calculated results show that the total amount of combustible gases in the propellant combustion products, contents of H_2 , CO and CH_4 decrease with the increasing of ammonium nitrate content. When the content of ammonium nitrate is more than 80%, the combustible gases are completely oxidized to carbon dioxide and water. Experiments were performed on a mixture of one served propellant of some gun-launched missile with propellant containing ammonium nitrate. Results show that when the content of ammonium nitrate propellant is 50%, the oxygen balance is increased by 39.2%. It reveals that the content of CO in combustion products is decreased by 32.8%, while integral optical density (IOD) is reduced by 36.4% by analyzing the photographs of gun muzzle flame.

Key words: applied chemistry; propellant; oxygen balance; desensitizing agent; oxidizer; gun muzzle flame

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读者·作者·编者

更正

本刊 2010 年 18 卷第 4 期 (387-392 页) 发表的《动态真空安定性试验 (DVST) 方法研究 (II): RDX 的热分解》一文中图 1 右纵坐标轴和图 2 左纵坐标轴的压力单位应为 kPa。

特此更正!

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