

LUO Yang, GAO Hong-xu, ZHAO Feng-qi, et al. Energy characteristics of propellant containing 3, 4-dinitrofurazanfuroxan (DNTF) [J]. *Chinese Journal of Energetic Materials (Hanneng Cailiao)*, 2005, 13(4): 225-228.

[15] 李猛, 赵凤起, 徐司雨, 等. 三种能量计算程序在推进剂配方设计

中的比较[J]. *火炸药学报*, 2013, 36(3): 73-77.

LI Meng, ZHAO Feng-qi, XU Si-yu, et al. Comparison of three kinds of energy calculation programs in formulation design of solid propellants[J]. *Chinese Journal of Explosives & Propellants*, 2013, 36(3): 73-77.

Energy Characteristics of CMDDB Propellants with Nitrofurazan Compounds

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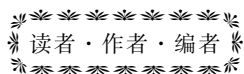
Abstract: Based on the minimum free energy method, the energy characteristics of six nitrofurazan compounds, 3-nitrofurazan (NF), 3,4-dinitrofurazan (DNF), 3-nitrimino-4-nitrofurazan (NNF), 3-nitramino-4-nitrofurazan ammonium salt (ANNF), 3-nitrimino-4-nitrofurazan hydrazonium salt (HNNF) and 3-nitramino-4-nitrofurazan hydroxyl ammonium (HANNF), were studied by NASA-CEA software. Effects of the content of nitrofurazan compounds on the energy characteristics of CMDDB propellants and effects of pressure on the energy characteristics of nitrofurazan /CMDDB propellants were studied. Results show that the specific impulses of HANNF and HNNF monopropellants are $2744.8 \text{ N} \cdot \text{s} \cdot \text{kg}^{-1}$ and $2802.2 \text{ N} \cdot \text{s} \cdot \text{kg}^{-1}$, respectively, which are obviously higher than that of RDX. Six nitrofurazan compounds make the specific impulse of CMDDB propellants increase substantially, in which HNNF and HANNF make the specific impulse of CMDDB propellants increase by $74.6 \text{ N} \cdot \text{s} \cdot \text{kg}^{-1}$ and $91 \text{ N} \cdot \text{s} \cdot \text{kg}^{-1}$, respectively. The specific impulse for the six propellants increases with the increase of pressure. The order affecting the specific impulse by pressure is $\text{DNF} > \text{NNF} > \text{HANNF} > \text{ANNF} > \text{HNNF} > \text{NF}$.

Key words: applied chemistry; solid propellant; nitrofurazan; energy characteristic; theory calculation

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高品质炸药晶体的出现为钝感弹药的研究与应用开辟了一条重要途径,高品质炸药晶体因而也成为目前国内外含能材料研究领域的热点之一。为促进高品质炸药晶体的研究和应用,《含能材料》将于2015年开设高品质炸药晶体研究专栏,专题报道高品质炸药晶体的制备、表征、性能、应用等领域的最新研究成果,促进学者间的交流。欢迎相关研究学者投稿。来稿建议为英文。来稿时请选择对应的专栏。

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