

Synthesis and Properties of 5,10-Bis(dinitromethyl)-fuzazan [3,4-e] bis([1,2,4] triazolo) [4,3-a:3',4'-c] pyrazine and Its Energetic Ion Compounds

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Abstract: An energetic compound 5,10-bis(dinitromethyl)-fuzazan [3,4-e] bis([1,2,4] triazolo) [4,3-a:3',4'-c] pyrazine (BOBTP, total yield of seven-step synthesis as 10%) was synthesized using diaminofurazan (DAF) as raw material. Its corresponding energetic ion compounds were synthesized via neutralization reaction collocated with a series of nitrogen-rich cations. Its structure was characterized by single-crystal X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), nuclear magnetic resonance (^1H NMR and ^{13}C NMR) and elemental analyses. Its thermal decomposition temperature was measured by thermogravimetry (TG) and differential scanning calorimetry (DSC). Its detonation performance were calculated with Explore 5 v6.02 software. Results show that the crystal of dipotassium salt of BOBTP belongs to monoclinic system and $C2/c$ space group with cell parameters of $a=1.9913(3)$ nm, $b=0.93491(12)$ nm, $c=1.6807(2)$ nm, $\beta=90.160(3)^\circ$, $V=3129.0(7)$ nm 3 , $Z=8$, $D_c=2.103$ g \cdot cm $^{-3}$, $M=1.752$ mm $^{-1}$, $F(000)=1976$. For energetic ion compounds obtained based on BOBTP, the measured densities at 25 $^\circ\text{C}$ are in the range of 1.62–1.75 g \cdot cm $^{-3}$ and the onset temperatures of thermal decomposition reaction are in the range of 186–232 $^\circ\text{C}$. The calculated detonation velocities and pressures are higher than 7500 m \cdot s $^{-1}$ and 20 GPa, respectively. The measured impact and friction sensitivities are relatively low. In which, the impact sensitivity of dihydroxylamine salt of BOBTP is 18 J and the friction sensitivity is 240 N.

Key words: synthesis; fused ring skeleton; 5,10-bis(dinitromethyl)-fuzazan [3,4-e] bis([1,2,4] triazolo) [4,3-a:3',4'-c] pyrazine (BOBTP); energetic ion compounds

CLC number: TJ55; O62

Document code: A

DOI: 10.11943/j.issn.1006-9941.2018.02.006

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更正

本刊 2017 年第 11 期《微/纳米 HMX 颗粒级配对 PBX 性能的影响》(作者: 靳承芬, 肖磊, 王庆华, 等)

图 1c 与图 1d 更正为:

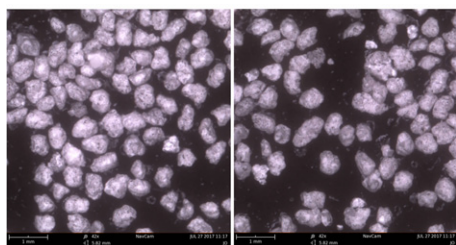
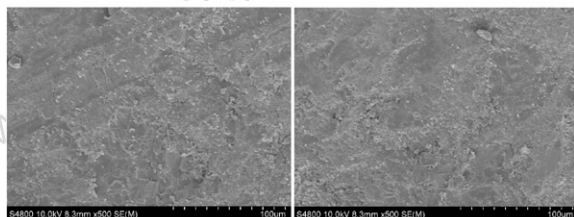
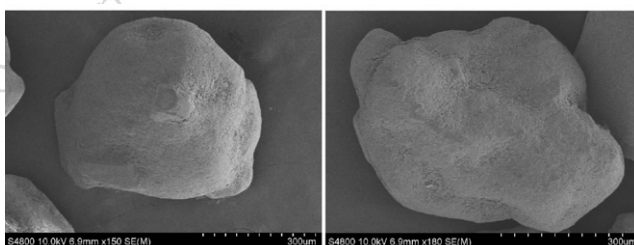


图 5c 与图 5d 更正为:



特此更正。

图 2c 与图 2d 更正为:



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