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Study of Detonation Reaction Zone and Energy Release Characteristics of the Nitrogen-rich Energetic Ionic Salt TKX-50 KAIYUAN TAN, 1.Institute of Chemical Materials, CAEP; 2.Beijing Institute of Technology, YONG HAN, JIAHUI LIU, ZHIJIAN YANG, XIAOJUN LU, Institute of Chemical Materials, CAEP, FENGLI HUANG, Beijing Institute of Technology — The Nitrogen-rich energetic ionic salt TKX-50 (bishydroxylammonium 5,5'-bis(tetrazolate-1N-oxide)) has been reported to be one of the most promising explosives in recent years and be regarded as a possible replacement for RDX. In this work, a TKX-50-based Polymer-Bonded eXplosive (PBX), PBX-1, containing the TKX-50 and the polymeric binder fluororesin F2314 with a mass ratio of 95/5 was prepared. The C-J detonation parameters, detonation reaction zone length, Gurney velocity and the parameters of Jones-Wilkins-Lee equation of state for the detonation products of PBX-1 were experimentally obtained. Some detonation parameters of the HMX-based PBX, PBX-2, and the RDX-based PBX, PBX-3, both of which contain the energetic compounds and F2314 with the same mass ratio as PBX-1, were also measured for a comparative analysis. It was shown that the detonation velocity of PBX-1 was higher than that of PBX-2, substantially higher than of PBX-3, however, the acceleration ability of PBX-1 was lower than that of PBX-2, close to of PBX-3. Some possible causes for these results were proposed.

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