

COMBUSTION MECHANISM OF POTASSIUM DINITRAMIDE AND ITS BINARY MIXTURES WITH NITROESTER BINDER

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Abstract: Steady-state combustion of potassium dinitramide (KDN) and binary mixtures of KDN with a nitroester-based energetic binder has been studied in a constant-pressure bomb in 0.1–15-megapascal pressure interval. The thermal stability has been examined under nonisothermal conditions by means of thermogravimetry and differential scanning calorimeter analyses. The temperature distribution in the combustion wave of the mixtures has been measured by using thin tungsten–rhenium thermocouples. The results obtained led to the conclusion that the observed increase in the burning rate on addition of KDN to the nitroester-based binder was caused by the increase in the temperature of the first flame zone and corresponding increase in the heat release rate.

Keywords: combustion; potassium dinitramide (KDN); nitroester-based energetic binder; thermal stability; temperature distribution in the combustion wave

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