

Solving the puzzles of energetic materials using thermal analysis tools and advanced kinetic modeling with THINKS

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Energetic materials (propellants, explosives, pyrotechnics) are intrinsically hazardous compounds. Thermal stability, thus, is critical at all stages of energetic materials development. However, the monitoring of thermally-induced processes in energetics is not straightforward: it is usually a highly heterogeneous process further complicated by phase transitions and autocatalysis. In presentation I will summarize our recent results on the topic from the angle of comprehensive use of various thermal analysis tools and advanced thermokinetic analysis of the data. More specifically, in supplement to traditional DSC and TGA methods we will consider the pressure DSC,^{1,2} evolved gas analysis,³ hot stage microscopy.^{4,5} The modern approaches to the kinetic analysis of complex process will be discussed,⁶ and some examples of the results obtained with open-source free thermokinetic software THINKS⁷ will be presented.^{2,4,5}

Literature

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