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Title: Influence of Water Content in Emulsion Explosives Basic Substance on Their Thermal Decomposition and Calculation of Kinetic Parameters

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关键词: 分析化学; 乳化炸药基质; 含水量; 热分解; 反应动力学

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摘要: 为研究乳化炸药基质含水量对其热分解特性和化学动力学参数的影响，制备了含水量分别为3.46%和12.27%的乳化基质。用DSC TG联用仪得到两试样在不同加热速率下的DSC、TG DTG图谱。通过对比外推起始分解温度、组成及图谱，研究了水含量对其热稳定性和热分解特性的影响。结果表明，无论含水率多少，在被加热初期，基质失重缓慢平稳；失重的主要原因是失水，这些水主要是游离于基质中的水和被加热时少量乳化微粒破乳后释放的水；低含水量基质外推起始分解温度明显低于高含水量。分解开始后，含水量高的乳化炸药基质放热速度和失

Abstract: Two emulsion explosives basic substances with 3.46% and 12.27% water were prepared in order to study the influence of water content in emulsion explosives basic substances on the characteristics of thermal decomposition and chemical kinetic parameters. DSC and TG DTG curves of the two samples under different heating rates were obtained by DSC TG. Through comparing the extrapolated initial temperature, composition of emulsion basic substances and their curves, the influence of water content on the thermal stability and thermal dcomposition characteristics of basic substances was studied. Results show that at initial stage of heating up basic substances, the mass loss rate of basic substances is slow and steady and it is primarily caused by water loss no matter whether water content in basic substances is high or low. The water mainly comes from two sources: free water in basic substances and that released from

some basic emulsion particles in broke emulsion basic substances when they are heated. The extrapolated initial temperature of low water content basic substances is noticeably lower than that of high water content basic substances.Compared with the common emulsion explosives basic substances, it is easier for powered emulsion explosives basic substances to decompose at a lower temperature. After the starting of decomposition, the heat release rate and mass loss of higher water content basic substances is faster than that of lower water content basic substances. The chemical kinetic parameters of the two emulsion explosives basic substances were calculated.

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