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Features of the Valorization of Single and Double Based Powders for Codetonation in Emulsion Explosives JOSE B. RIBEIRO, RICARDO MENDES, BRUNO TAVARES, ADAI/LEDAP - Mechanical Engineering Department of the University of Coimbra, CRISTINA LOURO, CEMUC - Mechanical Engineering Department of the University of Coimbra — In this work, features of the thermal and detonation behavior of compositions resulting from the mixture of single and double based gun powder within ammonium nitrate (AN) based emulsion explosives are shown. That includes results of thermodynamic-equilibrium calculations of the detonation velocity, the chemical compatibility assessment through differential scanning calorimetry [DSC] and thermo gravimetric analysis [TGA], the experimental determination of the detonation velocity and a comparative evaluation of the shock sensitivity using a modified version of the “gap-test”. DSC/TGA results for the compositions and for the individual components overlap until the beginning of the thermal decomposition which is an indication of the absence of formation of any new chemical specimens and so of the capability of the composition components. After the beginning of the thermal decomposition it can be seen that the rate of mass loss is much higher for the compositions with gun powder than for the sole emulsion explosive. Both, theoretical and experimental, values of the detonation velocity have shown to be higher for the powdered compositions than for the pure emulsion explosive. Shock sensitivity assessment have ended-up with a slightly bigger sensitivity for the compositions with double based gun powder when compared to the single based compositions or to the pure emulsion.

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