MECHANISM OF INITIATION OF PARTICLES IN PROPAGATION OF COMBUSTION AND DETONATION AT LOW-DENSITY MECHANICALLY ACTIVATED POWDER MIXTURES

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Abstract: The analysis of supersonic propagation of energy-release wave in mechanically activated powder mixtures is conducted. It is shown that under certain conditions, this process has all attributes of detonation and should be recognized as one of the varieties of detonation. At the same time, it is shown that this type of detonation is fundamentally different from the classical detonation, such as in gas: instead of a shock wave, a densification wave propagates in the powder mixture in which occurs, mainly, not compression of material of the particles but densification of the powder due to shift of the particles. The mechanism of initiation of chemical reactions in the powder mixture during the passage of densification wave is suggested. The proposed mechanism is consistent with the available experimental data.

Keywords: detonation; low-density powder; mechanical activation; mechanism of initiation

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