NONTHERMAL SOLVATE IGNITION OF PROCESSES OF ORGANIC SELF-PROPAGATING HIGH-TEMPERATURE SYNTHESIS. THE ROLE OF PRODUCT CRUST

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Abstract: The original mechanism of the solid-state combustion, ignited by local addition of microquantities of water to mixture of dispersed piperazine and malonic acid (hydroignition) is proposed. It consists in eliminating the diffusion barrier at dissolving of the product crust previously formed on the reagent particles at their mixing, and the jumping mechanism of proton transfer (Grottghuss mechanism). The data obtained and their explanations seem unusual from the point of view of the ignition theory which did not consider ignition as a nonthermal process at the expense of intrinsic resources of reacting solids. The new method of ignition (hydroignition) can be successfully applied for effective one-pot click-synthesis of both organic and inorganic products in the self-propagating high-temperature synthesis mode and for designing autonomous ignition systems of various mixes.

Keywords: solid-state combustion; organic self-propagating-high-temperature synthesis (OSHS); non-thermal ignition; mechanism of hydroignition; one-pot click-synthesis

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