

Convection heat and mass transfer on the conditions of a polymer material ignition by a local heat source

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Abstract

Gas-phase ignition of a polymer material by heat metallic particle was numerically investigated. Physicochemical processes with transition were taken into account (heat conductivity, diffusion, convection, mixing, thermal decomposition, oxidation). Diffusion and convection mass transfer were analyzed. Ignition delay time was determined from initial temperature and sizes of a local energy source. Minimal initial temperature and sizes of a heat particle that can be the reason of ignition in a system "polymer material – particle – oxidizer" were determined.