ON THE DISPERSION OF ALUMINUM NANOPARTICLES

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Abstract: A possible mechanism for the dispersion of Al particles coated with a solid oxide shell with a radius of 10 nm to 1 μm to nonoxidized liquid clusters with a radius of 1 to 10 nm is proposed. When the particles are rapidly heated, the oxide shell of a certain thickness can crack and the liquid core can disperse into clusters, which then atomize and completely oxidize in gas-phase reactions. Based on the theory of wave processes in soft matter, the dependencies of the size of secondary clusters and the degree of their size dispersion on the size of the initial nanoparticles are proposed. A minimal size of the initial particle which can be dispersed is determined. The necessary conditions for particle dispersion are formulated. The influence of the initial particles size on self-ignition of aluminum in different oxidizing media is considered.

Keywords: dispersion; nanoparticle; cluster; aluminum

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