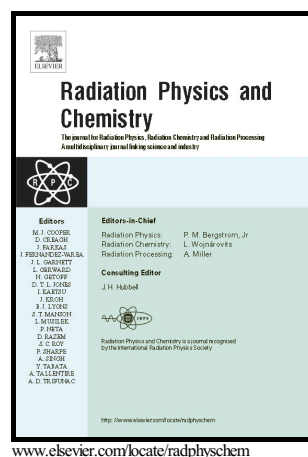


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**Effect of electron beam irradiation on the thermal properties of the aluminum nanopowder**

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**ABSTRACT**

Aluminum nanopowders are widely used in powder metallurgy, pyrotechnic industry, and chemical technologies. Aluminum nanopowder properties such as thermal effect of oxidation can be improved by the incorporation of different chemical additions. Different chemical additions in nanopowders are usually used for changing of some properties such as thermal oxidation effect or starting oxidation temperature. This study examines the influence of an absorbed dose of the electron beam irradiation on a thermal effect of oxidation for aluminum nanopowders. A thermal oxidation effect has been increased for the samples from 7898 J/g by 18.0% after 0.4 MeV and by 16.7% after 4.0 MeV electron beam irradiation for the same absorbed dose of 50 kGy. For the same time starting oxidation temperature was decreased by 5 % on absolute (Kelvin) scale only for the sample irradiated by 4 MeV electron beam.

**Keywords**

Nanopowder, Aluminum nanoparticles, Electron beam irradiation, Thermal properties, Oxidation

**1. Introduction**

Aluminum powders are traditionally widespread as an additive to high-energy materials (Ellern, 1968; Dreizin, 116, 1999; Dreizin, 117, 1999; Beaumont, 2000; Hunt, 2000; Teipel, 2004; Zarko, 2016). In order to increase a thermal effect and oxidation rate for aluminum powder different metal additives are usually used. It can cause some undesirable effects like an increasing in the two-phase losses in solid fuels and so on. Previous studies

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