Kinetics of nonisothermal dehydration of unirradiated and γ-ray irradiated neodymium (III) acetate hydrate

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Abstract:

Kinetics of dehydration of unirradiated and γ-ray irradiated neodymium (III) acetate hydrate with 10^3 kGy total γ-ray dose absorbed in air atmosphere were studied by isoconversional nonisothermal method. The dehydration proceeds in two steps with the elimination of 0.8 and 0.4 mol of H_2O, respectively. This result indicates that the investigated neodymium (III) acetate hydrate contains 1.2 mol of crystalline water in its structure. The dehydration reactions are best described by nucleation (A 2 model) and gas diffusion (D 4 model) for unirradiated and γ-ray irradiated samples, respectively. Analysis of the kinetic data using linear and nonlinear isoconversional methods showed that the apparent activation energy, E_a (kJ/mol) is dependent on the conversion degree, α, of the dehydration process. The E_a−α plots for both unirradiated and γ-ray irradiated neodymium (III) acetate hydrate showed that the dehydration is a

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