Kinetics and synthesis of Ag_2O nanoparticles by calcination and γ-irradiation of silver acetate

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Abstract

Kinetic studies for the non-isothermal decomposition of unirradiated and γ-irradiated silver acetate with 10^3 kGy total γ-ray doses were carried out in air. The results showed that the decomposition proceeds in one major step in the temperature range of (180–270 °C) with the formation of Ag2O as solid residue. The non-isothermal data for un-irradiated and γ-irradiated silver acetate were analyzed using Flynn-Wall-Ozawa (FWO) and nonlinear Vyazovkin (VYZ) iso-conversional methods. These free models on the investigated data showed a systematic dependence of Ea on γ indicating a simple decomposition process. No significant changes in the thermal decomposition behavior of silver acetate were recorded as a result of γ-irradiation. Calcinations of γ-irradiated silver acetate (CH3COOAg) at 200 °C for 2 hours only led to the formation of pure Ag2O mono-dispersed nanoparticles. X-ray diffraction, FTIR and SEM techniques were employed for characterization of the synthesized nanoparticles

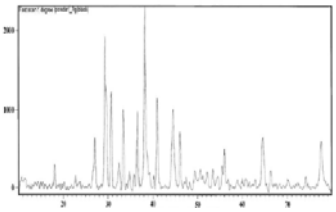

Fig 1. XRD pattern for synthesized silver oxide NPS.

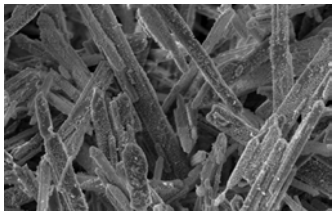

Fig. 2. SEM image of sliver oxide NPS.

Keywords: non-isothermal decomposition; γ-irradiation; silver oxide; nanoparticles

References

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