



Radiation stability and thermal behaviour of modified UF resin using biorenewable raw material-furfuryl alcohol

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ABSTRACT

The thermal stability of organic-inorganic nano-composites prepared by a two-stage polymerization of urea-formaldehyde resin (UF) with furfuryl alcohol (FA) and TiO₂ before and after irradiation has been researched. The two resins of urea-formaldehyde–TiO₂ composites, named: UF/TiO₂ and UF/TiO₂/FA, were synthesized. The thermal stability of obtained materials was studied by non-isothermal thermo-gravimetric analysis (TG), differential thermal gravimetry (DTG) and differential thermal analysis (DTA). UF hybrid composites have been irradiated (50 kGy) and after that their radiation stability was evaluated on the basis of thermal behavior. The free formaldehyde (HCOH) percentage in all prepared samples was determined. The minimum percentage values of free formaldehyde (0.04% and 0.03%) for UF/TiO₂ and UF/TiO₂/FA, respectively, after irradiation dose of 50 kGy are detected. The shift of temperature values for selected mass losses (T₁₀%) to a high temperature indicates the increase in thermal stability of samples based on UF resin modified with FA.

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