



# Hydrolytic, thermal, and UV stability of urea-formaldehyde resin/thermally activated montmorillonite nanocomposites

Suzana Samaržija-Jovanović<sup>1</sup> | Vojislav Jovanović<sup>1</sup> | Branka Petković<sup>1</sup> |  
Tijana Jovanović<sup>2</sup> | Gordana Marković<sup>3</sup> | Slavica Porobić<sup>4</sup> | Jelena Papan<sup>4</sup> |  
Milena Marinović-Cincović<sup>4</sup>

<sup>1</sup>Faculty of Science, University of Priština-Kosovska Mitrovica, Kosovska Mitrovica, Serbia

<sup>2</sup>Faculty of Science, University of Niš, Niš, Serbia

<sup>3</sup>A.D. Tigar, Pirot, Serbia

<sup>4</sup>Institute of Nuclear Science Vinča, University of Belgrade, Belgrade, Serbia

## Correspondence

Suzana Samaržija-Jovanović, University of Priština-Kosovska Mitrovica, Faculty of Science, Lole Ribara 29, 38220 Kosovska Mitrovica, Serbia.

Email: vojani@sbb.rs or

Email: suzana.samarzija@pr.ac.rs

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## Abstract

Urea-formaldehyde resin (F/U ratio of 0.8)/thermally activated montmorillonite (UF/ $\Delta$ TK10) nanocomposite was synthesized. The hydrolytical, thermal, and UV radiation stability of UF/ $\Delta$ TK10 nanocomposites are determined. UF hybrid nanocomposites have been irradiated with UV light with a wavelength of 254 nm and 366 nm, and after that, their radiation stability was evaluated. The free formaldehyde (FA) percentage in all prepared samples was determined. The sample was characterized by using X-ray diffraction analysis (XRD), non-isothermal thermogravimetric analysis (TGA), differential thermal analysis (DTA), and differential thermal gravimetry (DTG), with infrared (FTIR) spectroscopy. Crosslinked UF/ $\Delta$ TK10 nanocomposite shows the highest resistance to acid hydrolysis after UV irradiation at a wavelength of 254 nm. The values for  $T_{5\%}$  are identical for the unirradiated and UV irradiated (wavelength of 366 nm) UF/ $\Delta$ TK10 nanocomposite. It can be concluded that this sample is thermally most stable and shows good resistance to UV irradiation.

## KEYWORDS

nanocomposites, radiation, resins, thermogravimetric analysis (TGA)