

Biocomposites Based on Cellulose and Starch Modified Urea-Formaldehyde Resin: Hydrolytic, Thermal, and Radiation Stability

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Two biocomposites based on cellulose (UFC) and starch modified urea formaldehyde (UFS) resin (F/U ratio of 0.8) were synthesized using the same procedure. The hydrolytic, thermal, and radiation stability of biocomposites are determined. Also, released formaldehyde during the acid hydrolysis is determined. Biocomposites based on modified UF resin have been irradiated with (50 kGy). Cellulose modified UF resin after γ -radiation has 1.38% released formaldehyde; unmodified UF resin has 2.21% released formaldehyde. Thermal stability of biocomposites is determined using nonisothermal thermogravimetric analysis, differential thermal gravimetry (DTG), and differential thermal analysis with IR spectroscopy. Moving the DTG peak to higher temperatures indicates an increased thermal stability of cellulose modified UF resin, which is confirmed by the FTIR analysis. Gamma radiation most often causes a decrease in the intensity of the peaks in the FTIR spectrum. *POLYM. COMPOS.*, 40:1287–1294, 2019. © 2018 Society of Plastics Engineers

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