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THE INFLUENCE OF THE TYPE OF ACTIVATION OF THE MONTMORILLONITE ON THE HYDROLYTIC STABILITY OF UREA-FORMALDEHYDE NANOCOMPOSITE

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In this work the hydrolytic stability of nanocomposites based on urea-formaldehyde resin (UF) and montmorillonite (K10) as formaldehyde scavenger was investigated. Montmorillonite particles were activated by sulfuric acid with and without mechanical mixing using magnetic stirrer. The activation degree was determined using measurements of specific surface (*Sir's method*) and the cation-exchange capacity (CEC). The hydrolytic stability of prepared composites was determined by the mass loss estimation and via free formaldehyde and liberated formaldehyde concentration after composites acid hydrolysis. The amount of free and liberated formaldehyde was 0.06 % and 4.6 % for activated K10 without mixing and 0.12 % and 3.99 % for activated with mixing. The CEC values were 0.145 mol/kg and 0.162 mol/kg for activated K10 without and with mechanical mixing on a magnetic stirrer. The CEC value for inactivated K10 was 0.21 mol/kg. Specific surface measurement indicates that lower values were obtained for inactivated scavenger (74.2 m^2/g) compared to the activated. Specific surface area for activated scavenger without mixing was 183 m^2/g, but for activated scavenger with mixing it was 167 m^2/g. It was assessed that the UF resins with activated formaldehyde scavenger have a smaller content of free formaldehyde (0.06 %) compared to resin with inactivated (0.3603 %). The higher resistance to acidic hydrolysis and lower released formaldehyde percent (1.2252 %) has urea-formaldehyde resin with inactivated montmorillonite powder.

Keywords: Hydrolytic stability, Formaldehyde scavenger, Montmorillonite, Urea-formaldehyde resin, Free and liberated formaldehyde

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