



STRUCTURE AND PROPERTIES OF PVC AND WPC NANOCOMPOSITES WITH NANOSILVER

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The composites of PVC with wood flour and nanosilver were examined regarding the rheological and mechanical properties. The PVC compound containing PVC S-61 Polanvil (100 wt. %), mixed with 4 wt. % of tinorganic stabilizer, and 1 wt. % of paraffin wax was applied as a matrix of the hybrid composite. As a nanofiller the silver powder with mean dimension lower than 150 nm, delivered by Sigma Aldrich was introduced into the PVC matrix in a concentration between 0.01 wt. % and 0.1 wt. %. Subsequently, in the second stage of investigations, the PVC compounds with 0.01 wt. % of silver and with 15 wt. %, 30 wt. % and 50 wt. % of wood flour made from poplar (fraction from 0.5 to 2 mm), were prepared. The processing of all PVC compounds was performed in the Brabender mixing chamber (Plastograph®PL3S) at the temperature (T_{ch}) of 185°C, and at shear rate = 12,61 s⁻¹, where the torque was registered as a function of time. The test was carried out up to the time when to the equilibrium state of torque was achieved. In order to determine the influence of wood filler and nanosilver on the gelation of PVC matrix, the run of plastograms was analyzed. The homogeneity of PVC/WF/silver composite was determined by means of microscopy observations. The relationship between wood flour and nanosilver content and the mechanical properties will be presented and discussed.