



## Synthesis of Lignin-Based Polymer Coatings by Miniemulsion Polymerization

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Lignin is natural polymer characteristic for its antioxidative and fire-retardant properties. In this research work lignin was used as filler for synthesis of polymer composites via in-situ miniemulsion polymerization. As monomer system were used methyl methacrylate and butyl acrylate in 50:50 weight ration. Lignin was added in 1wt%, 2 wt% and 3 wt% relative to monomers. The incorporation of lignin within the polymer matrix was confirmed by Infrared spectroscopy with Furrier transformation. The obtained composites were coated on commercial poly(urethane) – PU foam by dip coating in order to evaluate their fire-retardant ability. The successful coating of the PU foam with composite was investigated by determining the density, contact angle and surface energy of the neat PU, and PU coated with neat copolymer and with the different composites. From the obtained results was concluded that the density of the coated PU increased for approximately seven units and the contact angle decreased with an increase in the amount of lignin, i.e., the composite with 3 wt% lignin shows the lowest values for the contact angle (90.39°). The surface energy significantly increased by increasing the percentage of lignin in the samples, that is, compared to neat PU, the sample with 3 wt% lignin had three times higher surface energy. The flammability of the samples was investigated using UL-94 standard. The results suggested that the addition of lignin leads to decrement of the burning time of the PU foam, from 14.27s needed for burning the neat foam to 12s needed for the reinforcements with lignin.

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