New Approaches to Formaldehyde- and Resorcinol-Free Adhesion Promotion in High-Performance Fiber Composites

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Abstract

Due to the increasing health and regulatory scrutiny of resorcinol-formaldehyde-latex (RFL) adhesion promoter systems, there is a growing demand for sustainable high-performance alternatives for technical elastomer products. Lignosulfonate and 5-hydroxymethylfurfural (HMF) are promising bio-based raw materials which, due to their chemical structure, are considered potential components of new adhesion promoter systems. In this work, various lignosulfonate- and HMF-based adhesion promoter systems for cord impregnation were developed and investigated on polyester (PES) and polyamide (nylon 66). The results indicate that these bio-based adhesion promoters have potential as sustainable alternatives to conventional RFL systems by enabling the formation of adhesive layers between textile reinforcing fibers and elastomer matrices.

Keywords: Lignosulfonate, 5 hydroxymethylfurfural, fiber rubber adhesion, resorcinol formaldehyde latex replacement

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