BIO-BASED RESINS: REVIEW AND CHARACTERIZATION OF A NEWLY SYNTHESIZED FORMULATION

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The incorporation of biomass feedstocks is essential for the advancement of sustainable materials as substitutes for fossil-based resources. In this context, furan derivatives have been explored as promising bio-based building blocks components. In our research, two specific furan derivatives, 2,5-Furandimethanol (FDM) and cis-cyclobutane-1,2-dicarboxylic acid (CBDA), both of which were derived from Furylacrylic acid, were selected as starting point. An allylation was performed to modify the hydroxyl (-OH) groups of FDM and CBDA into allyl groups (C=C). The resulting bis-allyl derivatives were blended with commercially available tris- and tetra-functional thiol compounds and cured using UV light through a thiol-ene reaction. The UV-curing process was comprehensively examined using real-time FT-IR, photo-DSC, and photo-rheology methods to investigate the curing kinetics. Subsequently, the resulting bio-based thermosets' thermal-mechanical behavior using DMTA and tensile testing were analysed. The outcomes revealed similar properties to previously investigated bio-based thiol-ene thermosets, suggesting the potential application of the studied material in coating applications.

References

1. Lorenzo Pezzana[1], Nicolas Sbirrazzuoli[2], Giuseppe Melilli[2], Pierre Delliere[2], Dumitru Moraru[1], Nathanael Guigo[2], Marco Sangermano[1], Progress in Organic Coatings, 173, 2022.