

A novel gelatin-based copolymer derived from chromium shavings waste as eco-friendly wood adhesive

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Abstract

One environmental friendly wood adhesive based on waterborne polyurethane (WPU) grafted gelatin (G) was investigated in this research. The G was extracted from chromium shavings waste firstly, and then mixed with pre-polymer emulsion of WPU to synthesis the graft copolymer (WPUG) via solvent-free emulsion copolymerization. The synthesized copolymer was characterized regarding the mechanical properties test, TGA, FT-IR and other analysis technology. The results indicated that the WPUG has good stability, water resisting. The film-forming and thermal stability of G were improved after reacted with the pre-polymer of WPU, and the temperature of maximum weight loss was over 350 °C. The WPUG adhesive has excellent bonding power and mechanical properties, the dry bonding strength could reach 4.21 MPa when the R value was 1.5. The preparation of copolymer not only can perfectly satisfy the need of environment-friendly wood adhesives, but can also effectively improve the recycling use of chromium shavings waste.

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