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Significant improvement in performance of recycled polyethylene/wood flour composites by synergistic compatibilization at multi-scale interfaces

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Abstract: The interfacial compatibility is one of the key problems that should be solved to achieve high performance for highly filled wood plastics composite (WPC). In this paper, the compounds of multi-monomer graft copolymers of polyethylene (GPE) and polyethylene wax (GPW) were used to highly compatibilize the multi-scale interfaces of the recycled polyethylene (rPE)/wood flour (WF) composites. How the compounds affected the mechanical properties, rheological properties, water resistance and thermal stability were investigated. Results show that a high performance rPE/WF composite was successfully prepared by the synergistic compatibilization of the GPE/GPW compounds. GPE afford a strong interfacial interaction between rPE and WF while GPW supplement the interfacial interaction by permeating into the cavities and capillaries of WF. The composites compatibilized by the GPE/GPW compounds show significant improvement in mechanical properties and water resistance than the composites compatibilized separately by GPE and GPW, and maintain considerable rheological properties

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