TITLE STUDY OF MELT RHEOLOGICAL BEHAVIOR OF POLYMERIC MATERIALS CONTAINING PINEAPPLE LEAF FIBER WITH VARIOUS CHEMICAL SURFACE MODIFICATIONS

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ABSTRACT This research aimed to study the surface modification effect of pineapple leaf fiber (PALF) polymer composites, which consists of polypropylene (PP) and acrylonitrile butadiene styrene copolymer (ABS) mixed with alkali treatment, benzene diazonium salt treatment, silane treatment of PALF composites were studied to determine melt rheological properties, and polylactide (PLA) mixed with poly(D-lactide) (PDLA)-grafted PALF was also studied to determine the crystallization behavior; PLA mixed with poly(methyl methacrylate) (PMMA)-grafted PALF was also studied to determine tensile and melt rheological properties. Melt rheological behavior was found to depend not only on PALF content but also on the interaction between PALF surface and either PP or ABS. PP/Alkali- treated PALF and ABS/Benzene diazonium salt-treated PALF composites display high values of G' and G''. A good correlation between melt rheological and tensile properties of the composites containing surface-modified PALF was obtained. In case of PLA/PDLA-grafted PALF composite, the stereocomplex formation between PLA and PDLA-grafted PALF was not observed, although the interfacial interaction could be improved by stereocomplex at the interface. The result suggested that low percentage grafted of PDLA lead to no stereocomplex which was formed despite of successfully grafting of PDLA from PALF. To avoid this low percentage grafted of PDLA limitation, PMMA, which is also compatible with PLA was used to graft PALF instead of PLA. High percentage grafted PMMA with PALF was obtained. . Interestingly, the interfacial interaction between PLA and PALF in the solid state is different from that in the molten state. The interfacial interaction in the solid state can be improved with PMMA-grafted PALF, the interfacial interaction between PLA and PMMA-grafted PALF in the molten state is lower than that with alkali-treated PALF. Rheology is a very sensitive tool for studying the interaction between PALF and polymer. Therefore, Rheological properties are not always related to tensile properties. Rheological properties of PLA/PALF composite depend on polymer chain movements and interaction between polymer and PALF in different state.