

## **Effects of maleic anhydride polypropylene on tensile, water absorption, and morphological properties of recycled newspaper filled polypropylene/natural rubber composites**

### **Abstract**

This study focused on the effects of maleic anhydride-grafted polypropylene (MAPP) on tensile, water absorption, and morphological properties of recycled newspaper (RNP) filled polypropylene (PP)/natural rubber (NR) composites. The abbreviation MAPP will be used for its common name in this research work. For both uncompatibilized and MAPP-compatible RNP-filled composites, tensile strength and elongation at break ( $E_B$ ) increased at certain filler content, then decreased at higher filler content. Meanwhile, continuous increase of Young's modulus has been observed in the case of uncompatibilized and compatibilized composites. At similar filler content, compatibilized composites show higher tensile strength and Young's modulus but lower  $E_B$  than uncompatibilized composites. Water absorption study indicates that the incorporation of MAPP reduced water uptakes of the composites. This may be attributed to the enhanced adhesion between the MAPP-compatible RNP and polymer matrix, as evidenced from morphology study with scanning electron microscopy. The chemical interaction between MAPP-compatible RNP and polymer matrix was confirmed with Fourier transform infrared analysis.

**Keywords** — Recycled newspaper, maleic anhydride-grafted polypropylene, polypropylene, natural rubber.