

Enhanced hydrophobic performance of UV-curable palm oil polyurethane by fluoroacrylate monomer

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ABSTRACT

Driven by the versatility of crosslinked complex network formed by the reaction of double bonds during photopolymerization, ultraviolet (UV) curable palm oil polyurethane (POPU) was modified by the addition of fluoroacrylate monomer to increase its hydrophobicity properties. Fourier transform infrared spectroscopy showed a successful attachment of the fluoro group to POPU. Fluoroacrylate palm oil polyurethane (FPOPU) also showed good hydrophobic properties as FPOPU-6% has the highest contact angle which is 108.22°. In the sliding angle test, FPOPU-2% provided the highest roll-off properties with the lowest angle of incline which was 16.6°. The addition of fluoroacrylate at 6% also lowered the water absorption properties of POPU from 4.94% to 3.98%. To further investigate the cause of hydrophobicity increase, scanning electron microscopy and atomic force microscopy analysis were conducted. The morphology showed fluorine component migration increased the roughness of the coating by the coating's hydrophobicity performance. Overall, fluoroacrylate monomer addition successfully improved the hydrophobic properties of POPU.

KEYWORDS

Bio coating; Fluoroacrylate; Hydrophobic; Palm oil; UV-curable acrylate urethane

ACKNOWLEDGEMENTS

The authors would like to thank the University Malaysia Pahang Al-Sultan Abdullah, Kuantan, Pahang, Malaysia for providing financial support under Post Graduate Research Scheme (PGRS) VOT PGRS220380 and laboratory facilities.