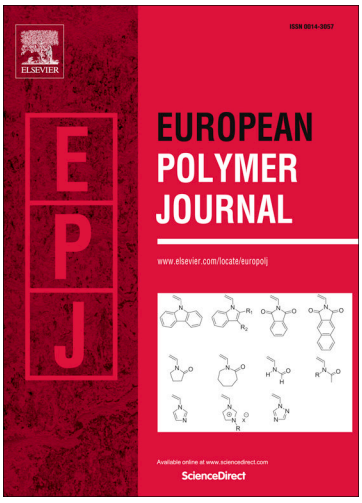

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Effect of hydrophobic fluoropolymer and crystallinity on the hydrolytic degradation of poly(lactic acid)

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Abstract: Hydrolytic behaviors of poly(lactic acid) (PLA) films with different crystallinities (~0, 30 and 40%) containing hydrophobic fluoropolymers were studied by evaluating the hydrophobicity and water absorption through measuring contact angle and FTIR, and by investigating the evolution of average molecular weights, morphology and thermal property. The results showed that the hydrophobic fluoropolymers enhanced the hydrophobicity of the surface of PLA, where water contact angle increased about 20˚, but they did not cause a decrease in water absorption in the bulk of PLA. The hydrolytic rate of samples was affected by both crystallinity of the PLA component and dispersion of the hydrophobic fluoropolymers. For amorphous samples, the fluoropolymers could well disperse in the PLA substrate and accelerate the hydrolysis of PLA component. The amorphous PLA had a hydrolytic rate of 0.0335 $week^{-1}$, while the rate of the amorphous sample with hydrophobic fluoropolymers increased up to 0.0458 $week^{-1}$. For the crystallized samples, neat PLA hydrolyzed faster than the blends. For example, the rate of PLA crystallized at 90 ºC was 0.0423 $week^{-1}$ while the values of the blends with PLA-*b*-$PFMA_{10}$ and PLA-*b*-$PFMA_{20}$ were 0.0325 and