

감마선이 조사된 저밀도 폴리에틸렌의 유변학적 거동

Rheological Behavior of γ -Irradiated Low Density Polyethylene

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The effects of γ -irradiation on the rheological behavior of low density polyethylene(LDPE) were investigated. γ -Irradiation was conducted on the LDPE samples at room temperature to doses of 3, 9 and 18 kGy at a dose rate of 6 kGy/hr, respectively in nitrogen, using a ^{60}Co source. Rheological characterization was performed using a Rheometrics Dynamic Spectrometer. Dynamic rheological response of the resins: dynamic moduli(storage and loss moduli) over a range of frequencies (0.1 to 100 rad/s) at 190°C at a strain of 15% was measured using a parallel plate geometry. The present study focused on the melt rheological properties of γ -irradiated LDPE in comparison with non-irradiated LDPE. The irradiated resins all have a higher viscosity than the control resin. The values of viscosity of LDPE increased with irradiation dose. The low shear viscosity increased highly while the high shear viscosity increased only slightly as irradiation increased. This is a significant finding in that increasing in high shear viscosity correlates to loss of processability. The increase in the viscosity of polymer according to the irradiation dose might be due to the cross-linking effect of the polymer.