The effect of crystallinity by chemical crosslinking reaction on thermal conductivity of high-density polyethylene

유승건[1,2], 권용진[3], 박철민[2], 홍순만[1], 구종민[1,*]
[1]한국과학기술연구원; [2]연세대학교; [3]롯데케미칼
(koo@kist.re.kr*)

The effect of crystallinity on the thermal conductivity of high-density polyethylene (HDPE) was investigated. The HDPE was chemically crosslinked with various concentration of dicumyl peroxide (DCP) in its molten state. The crystallinity dependence of thermal conductivity of HDPE was assured by evaluating results of gel content, density, DSC, TGA, XRD and WAXS analysis. As the content of dicumyl peroxide increased, the gel content of HDPE was rapidly increased by each other crosslinked polyethylene molecules, and the crystallinity calculated by DSC and WAXS was decreased with same tendency. These results have good agreement with change of thermal conductivity. The thermal conductivity of HDPE was rapidly decreased due to decrease of phonon mean free path by phonon scattered at the amorphous phase in HDPE with the decrease in the crystallinity.