A.9.1 Poids moléculaires moyens entre chaînes réticulées et développement d'arborescences d'eau dans le PR

SHAIKEVITCH A. , HARIDOSS S. - AT Plastics - Brampton - Canada
Q.X. Zhou and A. Rudin - Dept. of Chemistry, Univ. of Waterloo, Waterloo, Ont - CANADA

A9.1 Average molecular weight between crosslinks and water tree growth in crosslinked polyethylene.

SHAIKEVITCH A., HARIDOSS S. - AT Plastics - Brampton - Canada.
Q.X. Zhou and A. Rudin - Dept. of Chemistry, Univ. of Waterloo, Waterloo, Ont - CANADA

ABSTRACT

The average molecular weight between crosslinks (M_c) in crosslinked polethylene (XLPE) insulation is determined by obtaining shear modulus values from dynamic mechanical relaxation measurements. Rubber elasticity theory is used to correct for the effect of loose chain ends and the effective crosslink density is calculated. This method for measuring crosslink spacing appears to be reproducible and is independent of test temperature and strain, so long as this is in the linear viscoelastic region of the polymer. The crosslink functionality in XLPE is altered by using a polyfunctional triazine compound which acts as a crosslinking coagent. The concentration of peroxide is effectively reduced to achieve the same gel content and hence the same M_c values. The accelerated water tree test results on these samples performed using a needle geometry show that the crosslinking coagent acts as a water tree retarding additive.