

Abstract : Packetlike space-charge behavior and the isothermal decay processes of the injected charge in neat linear low-density polyethylene (LLDPE) and LLDPE doped with Al_2O_3 nanoparticles were investigated by the pressure wave propagation method. The 1-mm sheet samples, sandwiched by semiconductive electrodes, were submitted to 40 kV/mm of direct current field at various temperatures for 3 h. The charge-injecting rate and the apparent mobility of packetlike space charge under direct-current stress were compared among the samples subjected to different blending processes with or without nanoparticles. The slight doping concentration showed a significant influence on the space-charge dynamics, with a lower injecting rate and apparent mobility for higher doped samples. The isothermal decay processes of the injected charge indicated trap-modulated features. The phenomena were considered to be related to the changing morphology of the matrix material