

Abstract: Surface oxyfluorination of linear low density polyethylene (LLDPE) was performed to suppress space charge injection and accumulation under direct current high voltage. Significant suppression effect that there is almost no space charge inside LLDPE was obtained, as observed by space charge measurements based on the pressure wave propagation method. Oxyfluorination led to the substantial variation in chemical composition, forming the various polar groups in surface layer, as indicated by attenuated total reflection infrared analyses. The suppression mechanisms are mainly attributed to the charge trap change and the remarkable increase in permittivity of the oxyfluorinated surface layer, as investigated by open-circuit thermally stimulated discharge current measurements and surface energy calculations, respectively.