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Interfacial polarization and internal electron tunneling effect on dielectric properties of multilayer polymer films JUNG-KAI TSENG, ZHENG ZHOU, MATT MACKEY, JOEL CARR, ERIC BAER, LEI ZHU, Case Western Reserve University — Due to large contrasts in dielectric constant and volumetric conductivity, Maxwell-Wagner-Sillars interfacial polarization is observed in poly(vinylidene fluoride) (PVDF) based multilayer films. This interfacial polarization is helpful to enhance the breakdown strength of multilayer films, because they serve as electron traps to prevent hot electron thermal runaway. In this study, the relationship between volumetric resistivity and internal electron tunneling in polysulfone (PSF)/(PVDF) multilayer film is reported. In general, resistivity decreases with decreasing the thickness of the insulating PSF layer. This is attributed to the internal electron tunneling in thin PSF layers. As a result, the electron-hole neutralization via the PSF layer decreases the interfacial polarization in the PVDF layer, resulting in a lower volumetric resistivity.

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