

Charge-retraction time-of-flight measurement for organic charge transport materials

This letter describes an all-electrical technique, charge-retraction time-of-flight (CR-TOF), to measure charge carrier mobility through an organic layer. Carriers are injected and accumulated at a blocking interface, then retracted. The retraction current transient is nearly indistinguishable from a traditional time-of-flight photocurrent. The CR-TOF technique is validated by measurement of the hole mobility of two well-known compounds, 4,4'-(4'-methylphenyl)-4'-tris[N-(3-methylphenyl)-N-phenylamino]triphenylamine and 4,4'-(1-naphthyl)-4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl, utilizing 1,3,5-tris(N-phenylbenzimidazol-2-yl)-benzene as a hole-blocking layer. A sample layer thickness of less than 300 nm can be used for the measurement.