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Studying the Charge Transport Property through Fitting the Current of Carrier Extraction by Linearly Increasing Voltage (CELIV)

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A new method of data processing based on CELIV experiments is developed to determine the semiconductors' mobility and conductivity. This method is to solve the differential equation governing the carrier extraction process, and use the numerical solution to predict the carrier extraction current and compare the prediction with the experimentally extracted current. The best fit is obtained by adjusting the mobility, conductivity and the dielectric constant automatically in computer program loops until the minimum current difference is reached. The condition for the conventional CELIV method that the dielectric relaxation time should be much longer or shorter than the transit time is not required for this fitting method. The mobility and the conductivity of a methoxy film are determined by this fitting method. The results are consistent with the results from Space Charge Limited Current (SCLC) measurements and the LCR meter measurements on the same film.

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