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**Bias stress in PDI-CN2 and P3HT studied with Kelvin Probe Force Microscopy**[1] MINXUAN CAO, JASON MOSCATELLO, CHLOE CASTANEDA, BINGLAN XUE, Mount Holyoke College, OZLEM USLUER, ALEJANDRO BRISENO, University of Massachusetts Amherst, KATHERINE AIDALA, Mount Holyoke College — We have developed a technique that uses scanning probe microscopy (SPM) to study the real-time injection and extraction of charge carriers in organic semiconductor devices. We investigate PDI-CN2 and P3HT in a back gate field effect transistor geometry with gold electrodes. By positioning the SPM tip at an individual location and using Kelvin probe microscopy to record the potential over time, we can record how the charge carriers respond to changing the gate voltage while the source and drain electrodes are grounded. We see relatively fast screening when carriers are injected into the film. The screening is slower when carriers must escape from traps to exit the film. By incrementally stepping the gate voltage, we can probe different trap depths. By repeating the measurement, we observe the development of longer lived trap states, shown by the longer time recorded to fully screen the gate voltage.

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