Abstract Submitted
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Multilayer polymer electrets and their effects in organic electronics1[1] EVAN PLUNKETT, OLIVIA ALLEY, TEJASWINI KALE, QINGYANG ZHANG, Johns Hopkins Univ, BRIAN KIRBY, NIST Center for Neutron Research, DANIEL REICH, HOWARD KATZ, Johns Hopkins Univ — Thin film polymer electrets are of considerable interest for applications in organo-electronic systems, such as piezoelectrics, field effect transistors, and information storage. By copolymerizing combinations of substituted styrenes we have fabricated multifunctional polymers with tunable electronic and structural properties.[2] These polymers can be used to create structured electrets to control static charge and enhance its effect in organo-electronic systems. Copolymerization with vinylbenzo(4-cyclobutene) enables creation of thermally cross-linkable thin films resilient to subsequent exposure to solvent. This permits sequential deposition via spincoating of multilayer dielectric stacks with well-defined interface widths in the range 1.5 4 nm, as determined by neutron reflectometry. Via inclusion of fluorinated moieties and/or chargeable groups, such as triphenylamines, at controlled positions in the stacks, we have demonstrated multilayer polymer devices with tunable electronic properties such as reduced gate bias effects or large nontransient threshhold voltage shifts ($\Delta V_{th} = O(30V)$) as measured in pentacene based thin film transistors.

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[2]O.J. Alley *et al.*, Macromolecules, **49**, 3478 (2016)

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