

Abstract Submitted  
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**Reversible rectification in sub-monolayer molecular heterojunctions**<sup>1</sup> JOE SMERDON, CHRIS GIEBINK, Center for Nanoscale Materials, Argonne National Laboratory, MATTHIAS BODE, Univ. Wuerzburg, NATHAN GUISSINGER, JEFFREY GUEST, Center for Nanoscale Materials, Argonne National Laboratory — Pentacene and C<sub>60</sub> are archetypal molecules for optically active acceptor-donor heterojunctions and have been used as the active materials in bilayer solar cells. We will discuss UHV STM and STS measurements on these bi-molecular films deposited sequentially to form heterojunctions on Cu(111). It is observed that rectification can be detected at the single-junction limit, and that the direction of rectification flips in accordance with the polarity of the heterojunction. The morphology of heterolayers will also be discussed. It is found that the density of a Pn monolayer can be affected by choice of growth conditions, and in turn can affect the overall morphology of the heterolayer and the rectification behavior of the heterojunctions. We will also briefly discuss progress towards probing the photophysical behavior of these systems. The correlation of atomic-scale structure and electronic behavior at the single-junction limit has important implications for applications of such heterojunctions, such as solar cells or OLEDs.

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