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Strongly-hybridized C_{60}-decorated copper surfaces enable giant current rectification[1] JEFFREY R. GUEST, Center for Nanoscale Materials, Argonne National Laboratory, Argonne IL 60439, USA, JOSEPH A. SMERDON, Jeremiah Horrocks Institute of Mathematics, Physics and Astronomy, University of Central Lancashire, Preston, PR1 2HE, UK, PIERRE DARANCET, Center for Nanoscale Materials, Argonne National Laboratory, Argonne IL 60439, USA — Building on previous rectification demonstrations of strong electron-blocking character of pentacene/C_{60} layers on Cu(111) [1], we demonstrate hole-blocking and rectification ratios (RR) of over 1000 at biases of 1.3 V in bilayers of C_{60} deposited on copper [2]. Using scanning tunneling spectroscopy and first-principles calculations, we show that the strong coupling between C_{60} and the Cu(111) surface leads to the metallization of the bottom C_{60} layer, while the molecular orbitals of the top C_{60} are essentially unaffected. Due to this substrate-induced symmetry-breaking and to a tunneling transport mechanism, the system behaves as a hole-blocking layer, with a spatial dependence of the onset voltage on intra-layer coordination. This work further demonstrates the potential of strongly-hybridized, C_{60}-coated surfaces to harness the electrical functionality of molecular components. [1] J. A. Smerdon *et al.*, Nano Letters **16**, 2603 (2016); [2] J. A. Smerdon *et al.*, *submitted*.

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