Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

**Gold contacts for rubrene SC–FETs: the older, the better** TINO ZIMMERLING, BERTRAM BATLOGG, ETH Zurich — Excellent charge injection, device stability, and high reproducibility in the device fabrication are key to investigate intrinsic properties of organic semiconductors in e.g. diodes and field-effect transistors (FETs). In this systematic study we show that these requirements can be met by properly conditioning the gold electrodes in a rubrene flip crystal FET — a setup which is frequently used to explore fundamental organic electronic physics. Gold electrodes have been evaporated under HV conditions on Cytop as gate insulator. The electrodes had been exposed to air for 15 min to 1000 min before rubrene crystals have been laminated. We evaluated the efficiency of charge injection by calculating the contact resistance at the gold–rubrene interface. We observe a systematic decrease of the contact resistance by factors of up to $10^3$ and improved device stability in terms of contact resistance and mobility after long-term air exposure. From these findings we deduce a simple recipe to fabricate non-contact-limited FETs employing rubrene crystals and gold electrodes. These observations in a typical laboratory environment are in line with the view that charge injection is not simply determined by the ideal metal workfunctions and the HOMO/LUMO levels measured under UHV conditions.

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Date submitted: 09 Nov 2012 Electronic form version 1.4