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Nanotransfer printing for patterning conductive copper features KIMBERLY DICKEY, YANGMING SUN, YUEH LIN LOO, University of Texas at Austin — The drive for low-cost electronics creates a need for new techniques to directly and inexpensively pattern copper features in the 1-100 μ m range. We have developed a solventless, additive approach for printing permanent, conductive copper features at ambient conditions. Our technique is analogous to previously established nanotransfer printing (nTP) procedures for patterning gold with one marked difference. When copper is deposited onto a poly(dimethylsiloxane), PDMS, stamp, residual oligomers from the stamp penetrate between copper grains. This penetration disrupts the conductive pathway between copper grains; the printed copper patterns are electrically insulating as a consequence. This phenomenon is not observed with nanotransfer printing of gold features. A simple modification to the patterning procedure – leaching the PDMS stamps in boiling toluene for 2-3 days to remove uncrosslinked oligomers – results in printed copper patterns that are electrically conductive, with an average resistivity of 31μ ohms-cm.

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