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An Ultra-Thin Molecular Superconductor Made from Charge Transfer Complexes[1] KENDAL CLARK, Ohio University, A. HASSENIEN, AIST Tsukuba, Japan, S. KHAN, K.-F. BRAUN, Ohio University, H. TANAKA, AIST Tsukuba, Japan, S.-W. HLA, Ohio University — A class of charge transfer molecular systems having a D_2A arrangement (D = donor, A = accepter) exhibit superconductivity in the bulk and are often termed "unusual superconductors" based on the different nature of their superconducting states as compared to convention BCS superconductors. In this study we have formed an ultra-thin $(BETS)_2GaCl_4$molecular superconductor consisting of a single sheet of layered molecules composed of individual $GaCl_4$ sandwiched between the chains of a double *domino* stacked BETS on a Ag(111) surface. Amazingly, the superconducting gap can still be detected in such an ultra-thin molecular layer, and the shape of the gap reveals a d-wave pairing symmetry. Moreover, real space STM spectroscopic images provide direct evidence of the superconducting site as the BETS chains. In stark contrast to the high Tc superconductors, the spectroscopic maps clearly display nanoscale electronic order indicating robust superconducting properties at this extreme spatial limit..

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