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Metallization of a neutral organic radical by pressure

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We have measured resistivity vs. temperature and pressure on the fluoro-substituted oxobenzene-bridged bisdithiazolyl radical, FBBO. This is a layered, single component organic compound that is a Mott insulator at ambient pressure, due to the singly occupied molecular orbitals and an intrinsically high inter-molecular charge transfer energy barrier. Previous room temperature infrared absorption and conductivity measurements suggest that the charge gap of 0.1eV closes and the sample may become metallic at pressures above 3GPa[1]. We report direct transport measurements under various pressures on powder samples of FBBO down to low temperature, measured in an anvil pressure cell, that demonstrate the first metallization of a neutral organic radical.

[1] A. Mailman, et al., J. Am. Chem. Soc. 134, 9886 (2012). [2] D. Tian et al., J. Am. Chem. Soc. 137, 13146 (2015).

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