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Ligand control of magnetic ordering temperature in copper-pyrazine square lattice antiferromagnets[1] JOHN SINGLETON, National High Magnetic Field Laboratory, Los Alamos, P GODDARD, Warwick University, UK, I FRANKE, J MOELLER, S BLUNDELL, A STEELE, C TOPPING, University of Oxford, T LANCASTER, Durham University, UK, C BAINES, Paul Scherrer Institute, Switzerland, J BENDIX, University of Copenhagen, R MCDONALD, National High Magnetic Field Laboratory, Los Alamos, J BRAMBLEBY, M LEES, Warwick University, UK, S LAPIDUS, P STEPHENS, SUNY, Stony Brook, B TRAMLEY, University of Idaho, K FUNK, M CONNER, J CORBEY, H TRAN, Eastern Washington University, J SCHLUETER, Argonne National Laboratory, J MANSON, Eastern Washington University — Using a mixed-ligand synthetic scheme, we create a family of quasi-two-dimensional (Q2D) antiferromagnets: $[Cu(HF_2)(pyz)_2]ClO_4$ [pyz = pyrazine], $[CuL_2(pyz)_2](ClO_4)_2$ [L = pyO = pyridine-N-oxide and 4-phpyO = 4-phenylpyridine-N-oxide). These possess equivalent 2D $[Cu(pyz)_2]^{2+}$ nearly square layers, but show interlayer spacings from 6.57 Å to 16.78 Å, dictated by the axial ligands. Structural and magnetic properties are derived from x-ray diffraction, ESR, pulsed-field magnetometry and muon-spin rotation, and compared to those of the prototypical 2D magnetic polymer $Cu(ClO_4)_2(pyz)_2$. We find that the 2D exchange coupling remains largely unaffected by the axial ligand substitution, while the magnetic ordering temperature decreases slowly with increasing layer separation. Experimental data are compared to theory, including DFT.

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