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Electronic disorder, spin glass and large magnetoresistance in $\mathbf{FeSr_2Y_{2-y}Ce_yCu_2O_{8+x}}$[1] SEBASTIAN SAMBALE, GRANT WILLIAMS, JIBU STEPHAN, The MacDiarmid Institute, Wellington University of Wellington, PO Box 600, Wellington 6140, New Zealand, SHEN CHONG, Callaghan Innovation Research Limited, PO Box 31310, Lower Hutt 5040, New Zealand — We have successfully synthesized $FeSr_2Y_{2-y}Ce_yCu_2O_{8+x}$ (Fe1222) with a wide range of Ce and oxygen concentrations. Fe1222 belongs to an interesting group of compounds that contains a 2D-like CuO_2 layer and an oxygen deficient FeO_x layer. They are structural very similar to the well-studied superconducting and magnetically ordered $RuSr_2R_{2-x}Ce_xCu_2O_{10-x}$ (Ru1222). However, we do not observe superconductivity in Fe1222 and there is a spin-glass transition with antiferromagnetic exchange interactions arising from the disordered FeO_x layer at $\sim$25 K, which does not depend on the Ce or oxygen concentration. The electronic transport in the oxygen reduced samples is highly disordered and involves variable range hopping between localized states where there is a large negative magnetoresistance of $\sim$-22% at 8 T. The oxygen saturated samples are highly conducting at room temperature and display weak localization at low temperatures. The absence of superconductivity may be due to pair-breaking by a small Fe fraction in the CuO_2 planes.

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Sebastian Sambale
The MacDiarmid Institute, Wellington University of Wellington,
PO Box 600, Wellington 6140, New Zealand

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