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Tuning a spin-liquid into a correlated metal in $Na_{4-x}Ir_3O_{8-\delta}$[1] YOGESH SINGH, ASHWINI BALODHI, Indian Institute of Science Education and Research, Mohali — $Na_4Ir_3O_8$ is a candidate material for a 3D quantum spin-liquid. We present a comprehensive study of the structure, magnetic susceptibility, heat capacity, and electrical transport on polycrystalline samples with nominal composition $Na_{4-x}Ir_3O_8$ ($x \approx -.08$ to 1). The structure refinement shows that even though Na vacancies are being introduced the lattice parameters do not change much with x. The $x \geq 0$ samples show insulating behavior with strong antiferromagnetic interactions between effective $S = 1/2$ Ir^{4+} moments. For the $Na_{4.08}Ir_3O_8$ sample, magnetic susceptibility suggests a magnetic transition below $\approx 15K$. The $x \approx 1$ sample is a paramagnetic (semi)metal with various physical properties suggesting strong electronic correlations. The materials mid-way between the insulating and metallic samples show indication of having both localized and itinerant electrons. The strong antiferromagnetic interactions present in the $x = 0$ material survive in these mixed materials making them candidate spin-liquids in the presence of itinerant electrons. The electrical transport of the doped materials are consistent with the behavior of a semi-metal/semi-conductor with low carrier concentrations.

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