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New Realisations of Frustrated Quantum Spin Systems from Vanadium Based Oxyfluorides LUCY CLARK, FARIDA AIDOUDI, CAMERON BLACK, RUSSELL MORRIS, PHILIP LIGHTFOOT, University of St Andrews — We recently presented the first example of a material containing a kagome network of antiferromagnetically interacting V^{4+} $S = \frac{1}{2}$ cations, DQVOF (Diammonium Quinuclidinium Vanadium OxyFluoride). The $S = \frac{1}{2}$ kagome layers within DQVOF are separated by V^{3+} $S = 1$ cations. Our low temperature magnetic study of DQVOF suggested that the kagome layers remain decoupled from these inter-layer spins and that the system adopts a gapless QSL ground state [1]. Here, we will discuss how variations in the chemical methods used to prepare DQVOF can be employed to extend this family of frustrated V^{4+} based oxyfluorides. In particular, we will focus on a new phase ImVOF (Imidazolium Vanadium OxyFluoride), which consists of V^{4+} $S = \frac{1}{2}$ kagome layers like DQVOF, but the connectivity between the kagome layers is remarkably different. Single crystal X-ray diffraction reveals that the inter-layer vanadium species in ImVOF also sit on a kagome network. Magnetic susceptibility data of ImVOF reveal an absence of long range magnetic magnetic order down to 2 K despite significant antiferromagnetic exchange exchange ($\theta \sim -50$ K), which suggests that interesting physics is at play.

[1] L. Clark et al., Phys. Rev. Lett. 110, 207208 (2013)

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