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Magnetic and Thermal Properties of the Spin $S = 1/2$ Zig-Zag Spin Chain Compound In_2VO_5 * YOGESH SINGH, DAVID JOHNSTON, Ames Laboratory — The structure of In_2VO_5 consists of zig-zag V^{4+} (spin $S = 1/2$) chains along the b-axis. Prior to our work, there were two theoretical reports on this material.[1,2] One report suggested that the nearest-neighbor and next-nearest-neighbor interactions between the V^{4+} moments would be anti-ferromagnetic and frustrated,[1] while the second report suggested that both these interactions should be ferromagnetic.[2] An experimental study of the physical properties of this material had not been reported. We measured magnetic susceptibility χ, ac susceptibility χ_{ac} and specific heat C versus temperature T on In_2VO_5 and χ and C versus T on the isostructural, nonmagnetic compound In_2TiO_5. The $\chi(T)$ data for In_2VO_5 showed that the dominant magnetic exchange between the V^{4+} moments was ferromagnetic above 150 K. However, the $\chi(T)$ and the frequency dependence of the $\chi_{ac}(T)$ data indicate that below 3 K the system is in a spin-glass state indicating the presence of disorder and frustrated interactions at these temperatures. Our C and entropy S data suggest that there may be a structural change below 140 K in In_2VO_5 which could possibly change the interactions between the V^{4+} moments.

1. I. M. Volkova, J. Phys.: Condens. Matter **19**, 176208 (2007).
2. U. Schwingenschlogl, Phys. Rev. B **75**, 212408 (2007).

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