Magnetic properties in the doped spin-1/2 honeycomb-lattice compound $In_3Cu_2VO_9$

Y. J. Yan[a], Z. Y. Li[a], T. Zhang[a], X. G. Luo[a], G. J. Ye[a], Z. J. Xiang[a], P. Cheng[a], L. J. Zou[b], and X. H. Chen[a]

[a]Hefei National Laboratory for Physical Science at Microscale and Department of Physics, University of Science and Technology of China, Hefei, Anhui 230026, China
[b]Institute of Solid State Physics, Chinese Academy of Sciences, Hefei, Anhui, China

We report the magnetic properties in the Co- and Zn-doped spin-1/2 honeycomb-lattice compound $In_3Cu_2VO_9$. The magnetic susceptibility and specific heat experiments of $In_3Cu_2VO_9$ show no magnetic ordering down to 2 K. Approximately T^2-dependent magnetic specific heat and linearly T-dependence spin susceptibility at low temperature range were observed in $In_3Cu_2VO_9$, suggesting a spin liquid candidate with a S = 1/2 honeycomb lattice. When Cu^{2+} ions are partially substituted by Co^{2+} ions, both impurity potential scattering and magnetic impurity scattering induced by magnetic Co^{2+} ions break the homogenous spin-singlet spin liquid state, releasing the AFM long-range correlation. While replacing Cu^{2+} with nonmagnetic Zn^{2+} ions, the antiferromagnetic correlation between Cu^{2+} ions is destroyed, leading to suppression of low-dimensional magnetic properties.