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Physical properties of $R\mathbf{Mg_2Cu_9}$ (R = Y, Ce-Nd, Gd-Dy)[1] TAI KONG, SERGEY BUD'KO, PAUL CANFIELD, Ames Laboratory/Iowa State University — $R\mathrm{Mg_2Cu_9}$ is a family of hexagonal compounds with a single rare earth site that has a $\bar{6}$m2 local symmetry. In this talk, magnetic, electric transport and specific heat data measured on single crystals of $R\mathrm{Mg_2Cu_9}$ synthesized using Ta crucible will be presented and discussed. Due to a strong CEF effect, all local moment bearing members (except for isotropic $\mathrm{GdMg_2Cu_9}$) in the present study show a higher magnetic susceptibility when external field is applied along the ab-plane than along the c-axis. For R = Ce, Nd, Gd-Dy, the compounds order antiferromagnetically above 2 K. The ordering temperature deviates from de Gennes scaling with $\mathrm{GdMg_2Cu_9}$ ordering at a lower temperature than $\mathrm{TbMg_2Cu_9}$. $\mathrm{PrMg_2Cu_9}$ does not order magnetically down to 2 K and might have a singlet ground state. This series of compounds offer an opportunity to study in-plane anisotropy of rare earth in a hexagonal CEF configuration, following our previous work on in-plane 4-state clock model in a tetragonal system, for example: $\mathrm{HoNi_2B_2C}$ (P.C. Canfield et al. PRB 55, 970) and $\mathrm{DyAgSb_2}$ (K.D. Myers et al. PRB 59, 1121).

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Tai Kong
Ames Laboratory/Iowa State University

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