Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Spin frustration effect near the Mott transition in the pyrochlore-type molybdates SATOSHI IGUCHI, YUTA KUMANO, KOJI OISHI, Univ. of Tokyo, YOSHINORI TOKURA, Univ. of Tokyo, Multiferroics Project ERATO, and CMRG-RIKEN — Spin frustration and nontrivial spin structures by antiferromagnetic spins on a frustrated lattice have been widely studied such as a spin ice system with the pyrochlore structure $Ho_2Ti_2O_7$. However, spin frustration effects on conduction electrons have been less studied so far. Here, we have investigated spin frustration effects near the insulator-metal (Mott) transition in pyrochlore molybdates, where a paramagnetic diffuse metal state with antiferromagnetic spins is characteristic. Hole carriers were introduced by doping of Cd ions into the spin glass (Mott) insulator $Y_2Mo_2O_7$. The insulator to metal transition occurs at around $x = 0.1$ in $(Y_{1-x}Cd_x)_2Mo_2O_7$ with magnetically spin glass ground state. With increasing in the hole concentration, the spin glass transition disappears at around $x = 0.30$ and the resistivity shows almost no temperature dependence. Such a paramagnetic diffusive metallic character has been widely observed in $R_2Mo_2O_7$ (R = rare-earth ion) under high pressures. We have also measured the heat capacity in the system and found the anomalous enhancement of effective electron mass at around the transition from the spin glass metal to the paramagnetic metal phase.

Satoshi Iguchi
Univ. of Tokyo

Date submitted: 18 Nov 2010 Electronic form version 1.4