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Monte Carlo study of a spin-ice type Kondo lattice model on a pyrochlore lattice HIROAKI ISHIZUKA, Dept. of Appl. Phys., Univ. of Tokyo, MASAFUMI UDAGAWA, Dept. of Appl. Phys., Univ. of Tokyo, MPI-PKS, Dresden, YUKITOSHI MOTOME, Dept. of Appl. Phys., Univ. of Tokyo — Recent experiments on geometrically frustrated metallic oxides, such as pyrochlore oxides $R_2Mo_2O_7$ and $R_2Ir_2O_7$, have drawn increasing interest in the effect of geometrical frustration in itinerant electron systems. In these systems, the coupling between electrons and frustrated magnetism leads to various fascinating phenomena. However, much less theoretical studies have been done by treating the interplay of localized spins and itinerant electrons in an unbiased manner. To clarify electronic and magnetic behaviors in such spin-charge coupled systems on frustrated lattice structures, we investigate a spin-ice type Kondo lattice model on a pyrochlore lattice by a real-space Monte Carlo simulation. By employing a sophisticated algorithm, we conduct calculations up to 2048 sites. We show that the system exhibits keen competition between various magnetic phases depending on the spin-charge coupling and electron density. As a consequence, the system shows rich phase diagram with complex magnetic orderings and phase separations between them. Furthermore, in applied magnetic field, we identify a magnetization plateau for one of the novel magnetic phases. In the presentation, the phase diagram and the mechanism of the magnetic orderings will be discussed in details.

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