

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Pressure-temperature phase diagram for orbital and spin states in RVO_3 ($R=Y, Tb$) DAISUKE BIZEN, KEISUKE NAKATSUKA, TETSUYA MURATA, HIRONORI NAKAO, KAZUAKI IWASA, YOUICHI MURAKAMI, Tohoku University, TOYOTAKA OSAKABE, JAEA, SHIGEKI MIYASAKA, Osaka University, YOSHINORI TOKURA, University of Tokyo, CERC-AIST — Perovskite-type vanadium oxides RVO_3 ($R=Y, La-Lu$) show various physical properties coupled with the orbital and spin states. Orbitally ordered states of V $3d^2$ in YVO_3 have been systematically investigated by X-ray scattering technique under high-pressure and low-temperature (HP-LT). The pressure-temperature phase diagram for the orbital state was clearly determined from the crystal parameters, i.e. the lattice constants and the reflection conditions. It indicates that the C -type orbital ordering (C -OO) is stabilized as compared with the G -type orbital ordering (G -OO) by applying hydrostatic pressure. Based on the result, we succeeded in controlling the ground state of $3d$ -orbital in $TbVO_3$ from G -OO to C -OO by applying pressure. The spin state coupled with the orbital was also studied by neutron scattering under HP-LT. It elucidated that the magnetic ground state changed from the C -type spin ordering to the G -type one. This result indicates the strong coupling between orbital and spin states.

Daisuke Bizen
Tohoku University

Date submitted: 24 Nov 2007

Electronic form version 1.4