

DA05

## Structural and magnetic properties of Cu-doped manganites

 $La_{0.85}Te_{0.15}Mn_{1-x}Cu_xO_3$  ( $0 \leq x \leq 0.20$ )

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The effects of Cu doping at the Mn site on the structural and the magnetic properties of electron-doped manganites  $La_{0.85}Te_{0.15}Mn_{1-x}Cu_xO_3$  ( $0 \leq x \leq 0.20$ ) have been studied. The structural parameters were obtained by fitting the XRD data with the space group  $R\bar{3}c$  by the Rietveld method (Rietcaprogram), and the valence state of Cu ion is suggested to be +2, based on the variation of structural parameters. All the samples undergo the paramagnetic-ferromagnetic (PM-FM) phase transition. The magnetization measurements under an applied field of 0.1 and 4.5 T show that the Curie temperature  $T_C$  decreases with increasing the Cu-doping level, whereas the magnitude of magnetization at low temperatures increases as the Cu content increases from  $x = 0$  to 0.10 but decreases when  $x > 0.10$ . We consider that these interesting phenomena are intrinsic. The difference in the demagnetization field between samples with different  $x$  as the reason for the increase of magnetization can be ruled out, since all the samples are in an ellipsoidal shape with a demagnetization factor of 1/3. The appearance of superexchange ferromagnetism, and presumably the opening of new double-exchange channel between  $Mn^{3+}$ -O- $Mn^{4+}$  due to the introduction of  $Mn^{4+}$  ion, arising from a fact that  $La_{0.85}Te_{0.15}Mn_{1-x}Cu_xO_3$  can be written as  $La_{0.85}Te_{0.15}Mn_{0.85-2x}^{3+}Mn_x^{4+}Cu_x^{2+}O_3$ , result in for the initial increase of magnetization when  $x < 0.10$ . When  $x > 0.10$ , the Cu substitution leads to a decrease of the Mn-O-Mn bond angle and, hence, the decrease of magnetization.

DA06

Magnetic Properties and light-induced magnetism in  $Y_{0.25}Sr_{0.75}CoO_{3-\delta}$ 

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Magnetic properties and light-induced magnetism of oxygen deficient  $Y_{0.25}Sr_{0.75}CoO_{3-\delta}$  prepared with different sintered temperatures at 1100 °C and 1250 were studied. A characteristic magnetic memory effect associated with a magnetization jump [1] has been observed under dark on the sample prepared with high sintered temperature. This is possibly interpreted in term of the spin state transition of  $Co^{3+}$  ions from the intermediate to low spin state. There is a hysteresis without magnetization jump appears in the sample prepared at low sintered temperature. The sample shows higher  $T_C$  and relatively large magnetization. The observed higher magnetization may come from the contribution of the surface/volume ferromagnetism in  $Co^{3+}$  ions [2]. Two peaks found in zero-field magnetization curve on the low temperature sintered sample account for the coexistence of ferromagnetic and glassy phase. Under the near-infrared laser light irradiation, the high temperature sintered sample shows that the magnetization increases in the low temperature range and the jump temperature is unchanged. Light induced change of spin state of  $Co^{3+}$  ions from the nonmagnetic low-spin state to magnetic intermediate-spin state probably increases the magnetization. We try to discuss a magnetic phase diagram as a function of temperature on the present composition with different oxygen contents and light-induced stimuli.

## REFERENCES

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- [2] Y. F. Zhang, S. Sasaki, O. Yanagisawa, and M. Izumi, Acta Phys. Polo. A 111, 79 (2007).