

	承認日 Date of Approval 2014/6/6 承認者 Approver Takashi Ohara 提出日 Date of Report 2014/6/5
課題番号 Project No. 2013B0114 実験課題名 Title of experiment Ce substitution effect on the magnetic form factor in the electron-doped cuprate oxide 実験責任者名 Name of principal investigator Masaki Fujita 所属 Affiliation Tohoku univ, IMR	装置責任者 Name of responsible person Takashi Ohara 装置名 Name of Instrument/(BL No.) Senju BL 18 実施日 Date of Experiment 2014 3/20-3/23

試料、実験方法、利用の結果得られた主なデータ、考察、結論等を、記述して下さい。(適宜、図表添付のこと)
 Please report your samples, experimental method and results, discussion and conclusions. Please add figures and tables for better explanation.

1. 試料 Name of sample(s) and chemical formula, or compositions including physical form.
<p>Pr_{1.22}La_{0.6}Ce_{0.18}CuO_{4+δ}(PLCCO), as-grown single crystal Mass: 1.048 [g]</p>

2. 実験方法及び結果 (実験がうまくいかなかった場合、その理由を記述してください。)
Experimental method and results. If you failed to conduct experiment as planned, please describe reasons.
<p>Experimental method:</p> <p>In order to investigate the magnetic form factor in the Ce-doped T'-structured cuprate oxide, we performed neutron diffraction measurement on Pr_{1.22}La_{0.6}Ce_{0.18}CuO_{4+δ}. This sample shows the antiferromagnetic order at low temperature and potentially exhibits superconductivity after the adequate annealing procedure. We observed magnetic Bragg peaks in a wide momentum space under the two experimental configurations. Compare with as-grown and Ce-free sample, the magnetic intensity was weaker, and therefore, we measured the spectrum with longer counting time for each experimental condition.</p> <p>Fig.1 shows a neutron Laue picture. The bright and sharp spots, which correspond to the nuclear Bragg peaks, indicate that our crystal is of high quality. Then, we measured the magnetic Bragg peak at low temperature of</p>

2. 実験方法及び結果(つづき) Experimental method and results (continued)

We successfully observed the magnetic peaks at $(0.5, 0.5, L)$ positions up to $L=10$. However, since the $(0.5, 0.5, 19)$ reflection was observed in the Ce-free sample in our previous experiment, the ordered moment and/or the magnetic form factor at larger Q region are suppressed by Ce-doping. To conclude the change in the magnetism, size of ordered moment, correlation length, magnetic form factor and so on, we are going to analysis the data and will extract the role of Ce-doping for the emergence of superconductivity in the enelctron-doped T' -system.

We note that on well-defined in-plane magnetic peaks ($L=0$) with Q larger that that for $(1.5, 0.5, 0)$ was detected. Thus, the intensity of magnetic peak rapidly suppressed with increasing the in-plane Q , consistent with the contribution from the electron spin on the x^2-y^2 orbital to the magnetic intensity.

