On the other hand, neutron diffraction experiments have been performed in the La- and Y-doped $TbRhIn_5$ intermetallics in the AFM ordered phase (at the dilution limit of 40% of doping) at the Echidna (HRPD) instrument of the OPAL reactor, Australia. Our results show that there are no change in the magnetic moments orientation when compared to the non-doped compound (along tetragonal c-axis), the propagation vector remains the same and the size of the Tb moment is approximately the expected for a single Tb^{3+} ion.

We will discuss the details of magnetic structures determination as a function of CEF effects and how they are responsible in determining the magnetic moment directions for different *R* ions from this series as well as in determining the T_N evolution along the series and the behavior of magnetic susceptibility and specific heat.

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Keywords: diffraction, magnetism, synchrotron

MS96.P08

Acta Cryst. (2011) A**67,** C803

Structural biology and SAXS beamlines at the photon factory

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The Photon Factory (PF) is currently operating five structural biology beamlines, BL-1A, BL-5A, BL-17A, NW12A, NE3A, and two SAXS beamlines, BL-10C and BL-15A. Whereas all the structural biology beamlines use insertion device sources, the SAXS beamlines are conventional bending magnet sources.

BL-5A, NW12A and NE3A are high-throuput beamlines and we facilitate automation of the beamline operation with developments of sample exchange robots PAM, automated sample centering system and unified beamline control software [1,2]. Recently we started fully-automated data collection operation and it has been well used by the pharmaceutical companies.

BL-1A and BL-17A are small focus beamlines, dedicated to the micro crystal structure determination. In addition, softer xrays, 4 keV (BL-1A) and 6 keV (BL-17A), are available for low energy SAD structure analysis. We are now developing the helium chamber system to reduce the background.

BL-10C and BL-15A are two of the oldest beamlines at the PF and we have started upgrades of the SAXS beamlines [3]. We installed a 2-dimentional detector, RIGAKU R-AXIS 7 at BL-10C for the experiments of liquid samples. At BL-15A, we installed a flat panel detector, Hamamatsu C9728DK-10 for WAXS exeriments. We have a plan to construct a new insertion device SAXS beamline at BL-15A. We will move the current BL-15A to BL-6A this summer and will develop a new BL-15A beamline for SAXS experiments using small focus and softer energy x-rays.

We will present current status of the beamline upgrades and our future plans.

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Keywords: synchrotron, crystallography, SAXS

MS96.P09

Acta Cryst. (2011) A**67,** C803

Magnetic dynamical structures of possible spin-peierls system TiOBr

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Newly proposed spin-Peierls system TiO*X* (*X*: Cl, Br) has been revealed showing exotic structural and magnetic properties such as a successive phase transition, one-dimensional (1D) nature associated with orbital ordering of Ti ions and super-lattice structure being related to the Peierls instability [1-5]. It is pointed out that resulting only from an arrangement of Ti d_{xy} orbital, the formation of 1D spin chains and the spin-Peierls transition will be realized. Recently, it has been demonstrated that TiOBr also exhibits two successive phase transitions similar to TiOCl at T_{c1}=27K and T_{c2}=47K. Here we carried out inelastic neutron experiments in order to find the evidence of spin-Peierls transition. The inelastic spectrum with a large amount of poly crystalline sample of TiOBr shows the localized signal in the vicinity of the magnetic zone center Q=0.9Å^{-1}. Observed spin gap like signal lies at energy of ΔE~10meV. The gap energy in TiOBr is expected much higher from measured thermodynamic properties and by analogy with TiOCl. Constant Q cuts of the observed $S(Q,E)$ map show some Q-dependent structure in its intensity indicating the signal is sample oriented. The Q structure quite reveals the intensity is well explained by the powder averaged dynamical structure.

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Keywords: 1D, magnetism, dynamics

MS97.P01

Acta Cryst. (2011) A**67,** C803-C804

Making crystallography appealing to secondary school students

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Science has been established as a critical part of the secondary school curricula. Sadly, Crystallography is often left out of the teaching curricula for students at secondary school. Educators usually assume that teaching crystallography requires advanced science knowledge and that X-ray instruments are insecure, inaccessible, unsafe or difficult to use.