

ICANS XX,
20th meeting on Collaboration of Advanced Neutron Sources
March 4 – 9, 2012
Bariloche, Argentina

TOF investigations of multiple reflections accompanying forbidden ones

P. Mikula¹, M. Furusaka², K. Ohkubo², J. Saroun¹, M. Vrána¹ and B.S. Seong³

¹Nuclear Physics Institute ASCR, v.v.i., Czech Republic

²Faculty of Engineering, Hokkaido University, Sapporo, Hokkaido, 060- 8628, Japan

³KAERI, 1045 Daedok-daero, Yuseong-gu, Daejeon, Republic of Korea

mikula@ujf.cas.cz

Abstract

Multiple Bragg reflections (MBR) realized in one bent-perfect crystal (BPC) slab by sets of different lattice planes behave differently in comparison to the case of perfect nondeformed or mosaic crystal. Individual sets of lattice planes are mutually in dispersive diffraction geometry and the kinematical approach can be applied on this MBR process. Moreover, the elastic deformation carried out by the cylindrical bending can enormously strengthen the MBR effects which can be then investigated even at small neutron sources. By using neutron diffraction and the TOF method carried out at the Hokkaido Linac neutron source we have demonstrated that when setting the BPC slabs in the symmetric transmission geometry, many strong MBR reflections accompanying forbidden Si(222) ones can be observed. The advantage of the TOF method consists in the fact that not only primary MBR reflections related to the basic forbidden reflections were observed but also their higher orders which could be easily separated in the time spectra.