# その場中性子回折による LPSO 型 Mg 合金の変形機構の考察
# *In situ* neutron diffraction study of deformation mechanisms in LPSO-type Mg alloys

ゴン ウー、 相澤 一也、 ハルヨ ステファヌス、 川崎 卓郎、 岩橋 孝明、 神山 崇
日本原子力研究開発機構、 高エネルギー加速器研究機構

Recently, a new series magnesium alloys with microstructure consisting of Long Period Stacking Ordered structure (LPSO) and α-Mg phase, which exhibit excellent mechanical properties, i.e., the tensile yield strength of 610MPa and the elongation of 5% at room temperature [1], have attracted great attention. A special deformation mechanism - kink deformation was reported as the work-hardening mechanisms in LPSO phase alloys during deformation [2]. In the present investigation, *in situ* neutron diffraction experiments were conducted on the beam line 19 'TAKUMI' at J-PARC to clarify the compression deformation behavior in the LPSO-type phase alloys.

A series of ternary Mg-Zn-Y alloys with the microstructure consisting of different volume fractions of LPSO and α-Mg phase were measured in this study, which exhibit quite different mechanical properties. Kink deformation is the main deformation mechanism in LPSO structure, whereas twinning in combined with basal slip activates in α-Mg phase. LPSO structure reflections share more lattice strain than α-Mg during plastic regime implying LPSO structure acts as the harder component in these alloys.

The details of the deformation mechanisms of these LPSO-type Mg alloys will be elucidated and discussed based on the experimental results of lattice strain, diffraction peak broaden and texture evolution obtained by neutron diffraction during the presentation.

Reference:

[1] Y. Kawamura, K. Hayashi, A. Inoue and T. Masumoto: Mater. Trans. 42 (2001) 1172-1176.
[2] K. Hagihara, N. Yokotani and Y. Umakoshi: Intermetallics. 18 (2010) 267-276