# EFFECT OF LI/TI RATIO ON MICROSTRUCTURE AND THERMAL CONDUCTIVITY OF LITHIUM TITANATE

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Lithium titanate ($Li_2TiO_3$) is one of the most promising candidates among the proposed solid breeding materials for blanket module of a future demonstration power reactor (DEMO blanket). In our previous work, we have investigated synthesize method for $Li_2TiO_3$ with added Li as an advanced tritium breeding material. $Li_2TiO_3$ with added Li are expected to compensate the Li loss due to Li burn up and Li vaporization under the operating condition.

Thermal stress distribution of $Li_2TIO_3$ pebbles was changed at high temperature use . So, we have investigated the effect of Li/Ti ratio on microstructure and thermal conductivity of lithium titanate in order to estimate the characterization of thermal stress distribution in DEMO blanket.

In this study, several pellets of single phase $Li_2TiO_3$ with added Li (Li/Ti = 2.00-2.20) were synthesized using powders of $LiOH\text{-}H_2O$ and $H_2TiO_3$ as starting materials according to the synthesis method proposed by Hoshino[1]. Microstructure of the sample was measured by XRD, SEM, etc. Molar ratios (Li/Ti) of the synthesized samples were analyzed by the inductively coupled plasma atomic emission spectroscopy (see Fig.1). Thermal diffusivity and specific heat were measured by the laser-flash method and differential scanning calorimetry, respectively. Then thermal conductivity was calculated using an equation, $\lambda = \alpha C_p \rho$, where $\lambda$, $\alpha$, $C_p$, and $\rho$ are thermal conductivity, thermal diffusivity, specific heat, and density.

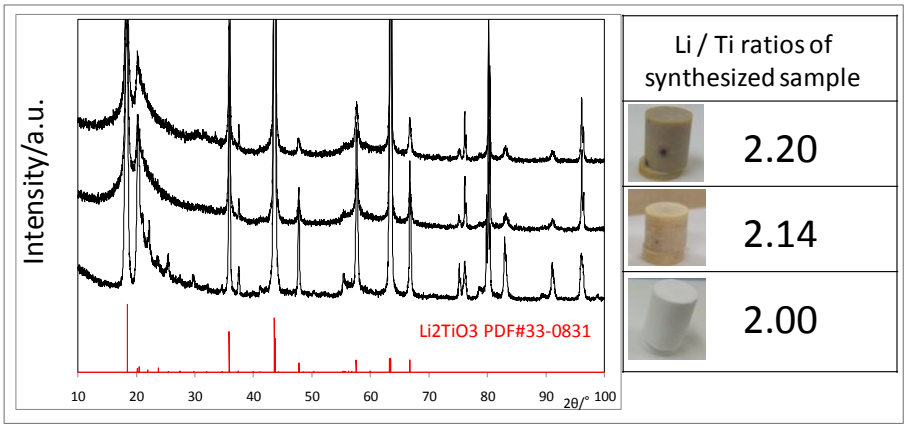


*Figure 1: X-ray diffraction patterns and appearance of the synthesized single phase $Li_2TiO_3$ with added Li (Li/Ti = 2.00-2.20).*

[1]T. Hoshino, K. Kato, Y. Natori, M. Nakamura, K. Sasaki, K. Hayashi, T. Terai, K. Tatenuma, *Fusion Eng. Des*. 84 (2009) 956-959.