# Thermal Expansion Studies of $Li_2TiO_3$ by Dilatometry and In-Situ High-Temperature X-Ray Diffraction

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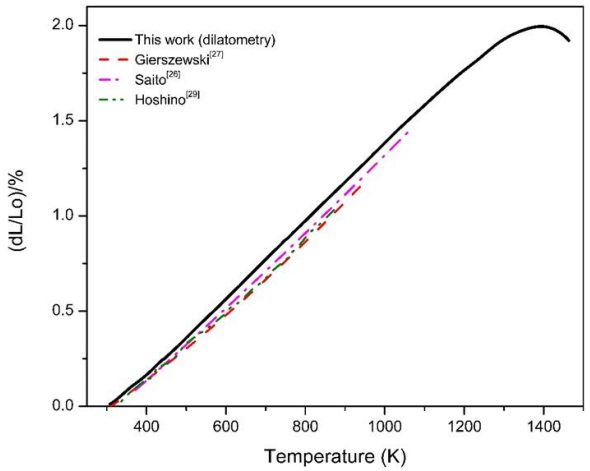


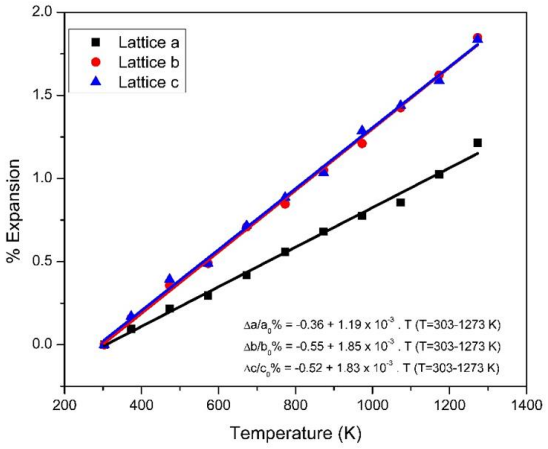


Crystallographic & Bulk Thermal expansion of $Li_2TiO_3$

Measuring the thermal expansion of ceramics is crucial because it tells us how much a ceramic piece will grow or shrink as the temperature changes. Imagine a ceramic mug - if it expands too much in the oven, it might crack. On the other hand, if it doesn't expand enough, it might not fit snugly with its lid.

This concept is even more important in machines like fusion reactors. Lithium titanate ($Li_2TiO_3$), a material used in these reactors, will also expand when heated by the intense temperatures. Knowing exactly how much it expands is essential to safely design key reactor parts, especially the fusion blanket where the heat is extracted. In this research, we used two techniques, dilatometry and high-temperature X-ray diffraction (HT-XRD), to measure both the overall expansion (bulk thermal expansion) and the expansion within the crystal structure (crystallographic thermal expansion) of this material.

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