

## Characterization of $\text{Li}_4\text{Ti}_5\text{O}_{12}$ by Raman Spectroscopy. The next step.

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Increasing role of lithium-ion batteries in global transportation and energy systems as well as ramping up battery production raise the problem of battery chemistry diversification. Lithium titanate  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  (LTO) is the only mass-produced alternative to natural and artificial graphites as negative electrode material and has already occupied its small niche of battery market. Further growth of LTO market share requires improving its properties (first of all, electronic conductivity) and/or decreasing cost of production (especially for nanosized LTO). Both approaches require advanced methods of structural characterization, enabling detection and proper description of LTO nonstoichiometry. In this work, we propose micro-Raman Spectroscopy (micro-RS) as simple and cost/time-effective tool for measuring stoichiometry small deviation and local heterogeneity.

Structural characterization of LTO by RS is far from novelty. Besides very first work by Proskuryakova et al written in Russian [1] we can mention early works of Kalbáč et al [2], Leonidov et al [3], Julien and Zaghbi [4], Aldon et al [5], and Mukai et al [6]. Unfortunately, almost all of more than 100 publications with RS data for LTO [7] use this method as auxiliary tool for sample purity confirmation. Keeping in mind that in case of graphite and others carbon material RS is considered as a reliable tool for structural defect characterization, we propose to make the next step and demonstrate fuller use of RS capabilities by implying own approach with big-data both mining and analysis.

### References:

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