

STOE COIN CELL SAMPLE HOLDER FOR TRANSMISSION GEOMETRY

Once started at the synchrotrons, the structural in situ analysis of electrode materials during a charge-discharge cycle in battery cells using X-ray diffraction became more and more popular.

Thus, a wide variety of self-made battery cell holders in reflection or transmission geometry found their way into the laboratories over the last years, but all commercially available solutions were only built for pouch cells and mostly for Bragg-Brentano goniometers. A commercial coin cell setup for transmission geometry still had to be developed.

Based on the studies of the Institute for Materials Science of Darmstadt University of Technology [1], the Institute for Applied Materials (IAM) at the Karlsruhe Institute of Technology (KIT) and the Leibnitz Institute for Solid State and Materials Research (IFW) Dresden [2, 3], STOE now offers such a sample holder.



The coin cell with Kapton windows can be clipped into a standard clamp which is integrated in a STOE transmission sample holder insert. The sample can be slewed to improve the counting statistics and to reduce the effects of preferred orientations, a two pole contacting to a potentiostat is provided.

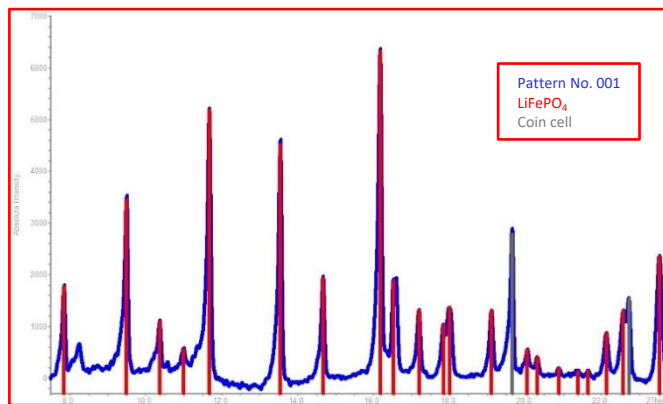
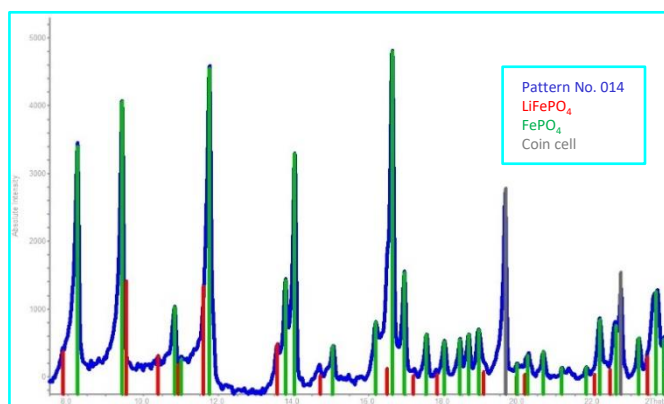
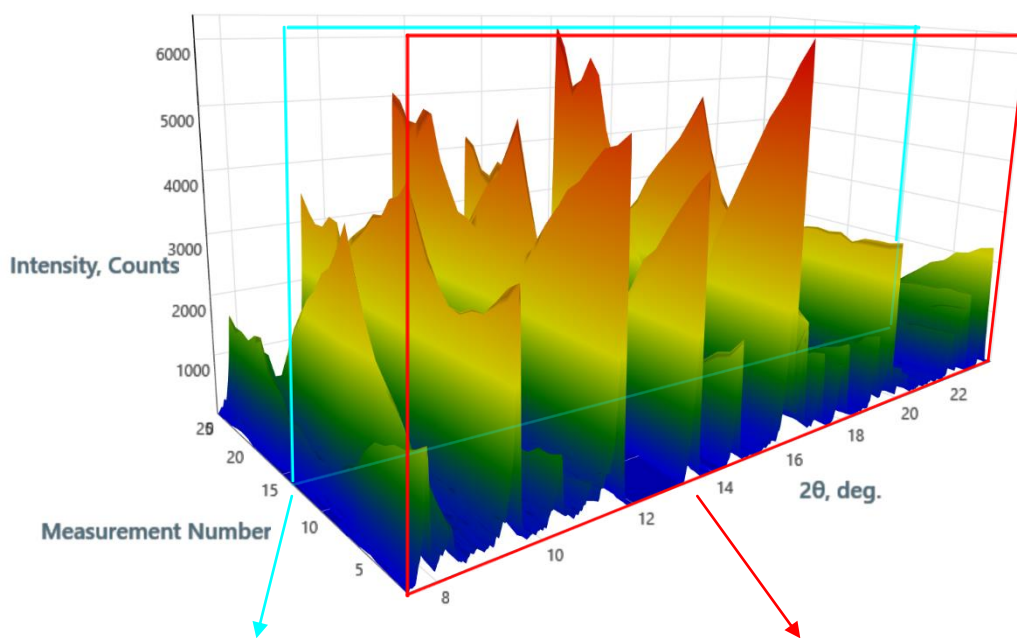
[1] Baehtz, C., Buhrmester, Th., Bramnik, N.N., Nikolowski, K. and Ehrenberg, H., *Solid State Ionics, Volume 176*, **2005**, 1647-1652.

[2] Herklotz, M., Scheiba, F., Hinterstein, M., Nikolowski, K., Knapp, M., Dippel, A.-C., Giebeler, L., Eckert, J. and Ehrenberg, H., *Journal of Applied Crystallography, Volume 46*, **2013**, 1117-1127.

[3] Herklotz, M., Weiß, J., Giebeler, L. and Ahrens, E., *German Patent DE102015214177B3*, **2015**

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XRPD data from a full charge/discharge cycle of a $\text{LiFePO}_4/\text{Li}$ half-cell, measured in the group of Professor A. Vlad, IMCN/MOST, UCLouvain on a STOE STADI P COMBI, equipped with a Mo tube, a Ge(111) monochromator for pure $\text{K}\alpha_1$ radiation and a Dectris MYTHEN2 R 1K detector with 1mm chip thickness, is presented in the 3D-plot below.



The 1st (red frame) and the 14th (cyan frame) XRPD pattern are highlighted to show the XRPD pattern of the charged (left) and of the uncharged (right) LiFePO_4 coin cell battery including the reflection markers of LiFePO_4 (red) and FePO_4 (green). The two reflections from the coin cell are indicated with grey markers.