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Cold Neutron Depth Profiling at the PGAA facility

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Neutron Depth Profiling (NDP) is a non-destructive method to probe concentration profiles of specific light nuclides (mainly Li-6, B-10, N-14) in different host materials. The energy loss of the charged particles produced upon neutron capture of the investigated nuclei is correlated to origin of depth and their signal intensity to concentration amount. Here, depth resolutions down to 5 nm can be achieved, depending on the sample material. The here presented N4DP setup is situated at the PGAA facility of MLZ, which provides ideal conditions for NDP: a cold white neutron flux up to $5 \times 10^{10} \text{ s}^{-1} \text{cm}^{-2}$, while maintaining a low background signal. Furthermore, both techniques complement each other, since NDP provides depth distributions of single nuclides within the material, whereas PGAA probes the bulk material composition.

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