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# Analysis of Lithium and Boron of Production and Real Samples using Cold Neutron Depth Profiling Method

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Neutron Depth Profiling (NDP) is a nondestructive near surface method that can analyze the component nuclide concentration versus depth distribution in a sample by detecting the charged particles emitted after the neutrons are absorbed. NDP technique has became an important method to measure depth profiles of light elements such as lithium and boron in lithium battery and semiconductor materials. The Korea Atomic Energy Research Institute NDP (KAERI-NDP) facility has been installed at the HANARO research reactor. For the first application of the KAERI-NDP system, boron implanted and lithium deposition samples were prepared for depth profiling of 6Li and 10B. Additionally, electrode film samples were prepared by disassembling the lithium ion battery used in the mobile phone. The production and real samples were installed at the target chamber of the KAERI-NDP system and irradiated for different times with cold neutrons at the CG1 guide of the HANARO. The charged particle spectra were measured by using ion implanted Si detector. Measured spectra were analyzed and depth profiles of 6Li and 10B were determined. For the production samples where 10B implanted into the Si wafer, peak depth, peak concentration and aerial density was matched with those of SIMS method within 2, 6, 9%, respectively. In the case of lithium deposition samples, there was a difference of 6Li concentration profile in the deep region for the thick sample. 6Li concentration of the cathode of lithium battery was 5 times higher than that of the anode sample.

**Primary author:** Dr PARK, Byung Gun (KAERI)

**Co-author:** Dr SUN, Gwang-Min (KAERI)

**Presenter:** Dr PARK, Byung Gun (KAERI)

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