
Contribution ID: **293** Type: **Talk**

# Neutron Depth Profiling and PGAA of Electrodeposited Prussian Blue Analog Thin Film Electrodes

*Wednesday, 19 September 2018 12:00 (15 minutes)*

Electrodeposited Prussian Blue Analog (PBA) thin films serve as attractive electrode materials for aqueous Na-ion batteries as grid-scale energy storage systems (ESSs). Such EESs based on secondary batteries are attractive to address the so-called generation versus consumption issue which is inevitably connected to the use of energy from naturally fluctuating renewable sources and the so-called Terawatt Challenge by 2050. Importantly, materials employed do not only need to provide sufficient energy and power density. They also need to be cost efficient, safe and environmentally benign [1,2] and need to be designed to last for at least ten years of operation in order to be economically viable. For achieving such long life times it is essential to understand the mechanisms of (dis)charging and degradation of the materials. Neutron depth profiling and prompt gamma activation analysis are used to determine the spatial distribution of alkali metal cations within, and the elemental composition of PBA thin films operated as intercalation compounds. Knowing how the cation distribution within the films and their chemical composition evolve with a change in state of charge will allow for better understanding the charge and mass transfer mechanisms within the electrodes so that optimized and more durable systems can be developed.
[1] Qian, J. et al. *Adv. Energy Mater.* **2018**, 1702619.
[2] Wessells, C. et al. *Nano Lett.* **2011**, 11, 5421-5425.

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**Session Classification:** Parallel session 8

**Track Classification:** P8 Functional materials and materials science