

USE OF A BE-DOME HOLDER FOR TEXTURE AND STRAIN CHARACTERIZATION OF LI METAL THIN FILMS VIA TILT-A-WHIRL METHODOLOGY

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The presence of residual strain plays an important role in materials properties and potential failure mechanisms. Currently we are investigating the role of strain in Li films for use in Li batteries; the magnitude of in-plane strain and compressive/tensile nature of the strain field may impact battery performance. As these films are highly reactive in air, we must maintain an inert environment around the sample during our X-ray analysis. Therefore, we have isolated the films within a special Be-dome specimen holder [see Rodriguez, et al. (2008) Powder Diffraction, 23, pp. 121-124] to prevent air exposure of the film while the diffraction measurement is performed. We have developed a protocol to characterize the presence of residual strain on various materials by employing an in-house Matlab-based texture analysis software package termed “TILT-A-WHIRL” [see Rodriguez, et al. (2013) Powder Diffraction, 28, pp. 81-89] which includes methods for macrostrain analysis via the $\sin^2(\psi)$ technique. We present macrostrain results and the simultaneous texture analysis of Li films generated using different deposition conditions. We will present our results in the context of battery performance and detail the challenges of this unique sample preparation regarding alignment, while outlining the diffraction artifacts in the collected datasets and how they are dealt with when analyzing the data.

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Oral presentation (texture/strain session)
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