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In-situ GISAXS during sputter deposition of metal nanolayers on functional polymer thin films for lithium-ion batteries

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Understanding the interface between metals, commonly used as current collectors, and ion-conducting polymers used in polymer lithium-ion batteries (LIBs) is crucial to develop highly reproducible, low-cost and reliable devices. To address these issues, sputter deposition is the technique of choice to fabricate scalable, reproducible and controllable nanometer and sub-nanometer metal layers on polymer thin films. The sputter deposition process, being well understood and controlled, offers advantages over chemical methods to tailor metal thin-film morphologies on the nanoscale and offers a superior adhesion of the deposited material.[1] We use in-situ grazing incidence small angle X-ray scattering (GISAXS) to investigate the formation, growth and, self-assembled structuring on polymer thin films used in LIBs.[2] The growth of noble metal layers on different polymer films is investigated.

[1] Schwartzkopf et al., ACS Appl. Mater. Interfaces 9, 5629 (2017).

[2] Schwartzkopf et al., ACS Appl. Mater. Interfaces 7, 13547 (2015).

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