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## Revealing the formation of sputter deposited 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. The successful use to reveal the growth of gold on polymer thin films, motivates the use of *in situ* grazing-incidence small-angle X-ray scattering (GISAXS) to investigate the formation, growth, and self-assembled structuring on polymer thin films for LIBs. Post deposition ellipsometry measurements provide additional information about intermixing layers and their composition. Different polyethylene oxide based polymer films are compared with respect to the metal layer growth.

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