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In-situ GISAXS investigation of the sputter deposition of metal contacts on photoactive polymer films

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Although based on organic materials, organic solar cells often include metal electrodes due to their unrivaled electronic conductivity. Thus, polymer-metal interfaces are inherently present in most OPV devices and have a major influence on their behavior. Understanding the growth mechanisms of metal contacts on polymer thin films plays a crucial role in identifying potential ways to enhance the device performance. We investigate the morphological changes at the metal-polymer interface during the sputter deposition of metal contacts onto photoactive polymer films via in-situ GISAXS. This technique allows insights into the structural evolution of the metal on the organic film. A model describing the process is developed based on earlier work on different material systems. Comparing the deposition behavior of typical electrode materials on thin films of photoactive organic materials helps to understand their influence on the respective device performance.

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