Contribution ID: **58** Type: **Poster**

Kinetics of Colloidal Quantum Dots during Printing

Wednesday, 11 December 2019 15:40 (20 minutes)

Colloidal quantum dots (QDs) are considered as a promising candidate for being used in next-generation solution-processed thin-film optoelectronic applications. The presently investigated QD thin films are mainly fabricated by a spin-coating, which is a lab-scaled (small-scaled) deposition method and the insights from the structure related aspects are supposed to be limited in a large scalable deposition method, like printing. In current work, we used real-time grazing-incidence small-angle X-ray scattering (GISAXS) to observe the QD kinetics during printing. The 2D GISAXS patterns indicate that QDs have formed an apparent well-ordered layer during the film's wet-dry transition. The layer acts a templating layer for the further particle stacking and the final film-forming. The inter-distance of QDs and the stacking behavior are further analyzed with a superlattice configuration.

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Session Classification: Poster session

Track Classification: Structure Research