
Contribution ID: **119** Type: **Poster**

# Out-of-equilibrium processes during phase transitions: An in-situ crystallization study of hybrid perovskites

*Wednesday, 9 December 2020 17:40 (20 minutes)*

Processes leading up to nucleation are pedantically known to proceed via the emergence of a low-amplitude, long wavelength instability through the material, creating the disturbances for a nucleation process to transpire. Owing to the thermodynamic instability of the high surface energy nanostructures, the nuclei concatenate to form higher surface area intermediates. The processes spanning from the disturbances to the formation of concatenated species occur in the matter of seconds which require high time resolution and sensitivity to register. Thereafter, the conversion of the stabilized concatenated species to the final crystalline material proceed via dissolution-recrystallization which requires further processing steps such as thermal annealing.
By combining in-situ optoelectronic and structural measurements in a custom-made analytical cell, we unveil previously experimentally inaccessible data during non-trivial phase transition processes during the in-situ crystallization of a prototypical hybrid perovskite thin film.

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**Session Classification:** Joint poster session of MLZ User Meeting and DN2020

**Track Classification:** DN: Materials