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Propositions

accompanying the dissertation

RELATIONSHIP BETWEEN STRUCTURAL AND OPTOELECTRONIC PROPERTIES IN MIXED SN-PB HALIDE PEROVSKITES

CONTROLLING DOPING, CRYSTAL DEFECTS, AND PHONON-INDUCED DISORDER FOR
EFFICIENT SOLAR CELLS

by

Jasmeen NESPOLI

1. Tin oxidation in tin-containing perovskites is practically unavoidable and leads to (metastable) doping. Whether this process already occurs in the precursor solution or after deposition of the perovskite film, dictates the mechanism and the effect on the transport properties (this proposition is related to Chapters 1 and 2).
2. The choice of chemical additives often begins with thinking outside the (glove)box, such as using caffeine as an additive for perovskites,* rather than rational design (this proposition is related to Chapter 3). *Wang R., *et al.*, *Joule* **3**, 1464-1477 (2019).
3. When an experimentally found value closely matches a value reported in literature using another method, this may still be coincidental rather than meaningful, e.g., the matching phonon energies derived from the temperature-dependent Urbach energy measurements and from Raman spectroscopy* (this proposition is related to Chapter 4). *Ledinsky M., *et al.*, *J. Phys. Chem. Lett.* **10**, 1368-1373 (2019).
4. A proficient PhD candidate should think more and do less — that is, find more time for reflection than for action.
5. In scientific research, the simplest explanation is often the most trustworthy.
6. The International System of Units should be compulsory across all countries and disciplines, like it is in scientific literature.
7. Although argumentation in papers seems very rational, research is often built on exploratory, quasi-random experiments.
8. Researchers who think too highly of themselves cannot be fully trusted as they lack critical thinking, visible in the absence of honest self-reflection.
9. Human empathy is inherently selective. It is stronger toward in-group members and diminishing or disappearing for outsiders; joint social activities are fundamental to mitigate this bias and promote social fairness and inclusion.
10. The presence of a domestic animal in the workspace enhances writing productivity.

These propositions are regarded as opposable and defensible, and have been approved as such by the promotors dr. ir. T.J. Savenije and prof. dr. A.J. Houtepen.