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Electronic Defects in Cu(In,Ga)Se₂ Schottky Diodes and Solar Cells investigated via Admittance Spectroscopy

Regardless their broad application and investigation, many properties of the CIGSe compound semiconductors have still not been sufficiently explained. For instance, the nature of certain defect signatures (interface or bulk) is still under discussion.

In my Master's thesis I prepared Schottky contacts (Al/CIGSe/Mo) from CIGSe solar cells (ZnO:Al/CdS/CIGSe/Mo) via etching removal of the ZnO:Al/CdS window layer, surface treatment of the remaining CIGSe layer, and subsequent metal deposition.

In order to differentiate between bulk and heterojunction interface defects, I recorded temperature-dependent admittance spectra (TAS) ($T=30-310$ K).

In my talk I will compare the common evaluation of TAS data (via the capacitance) to the direct analysis of the phase shift of the impedance, which does not require particular assumptions on the electrical device equivalent circuit, and discuss the reliability of this proposed evaluation method.

Furthermore, I will compare the defect signatures found in the Schottky devices to those found in the original CIGSe solar cells. Based on our results I will discuss the spatial origin of the different defect signatures.

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