To: Semiconductor Science and Technology Editorial Board
Subject: Article Submit

Dear Editor,

We are pleased to submit our manuscript entitled "Computer vision-based method for quantifying iron-related defects in silicon solar cell" for consideration for publication in Semiconductor Science and Technology (Focus Collection on Defects in Semiconductors).

Defects in semiconductor and functional materials critically influence their electrical, optical, and catalytic properties. Therefore, developing reliable and quantitative methods for their characterization is of fundamental and technological importance. Machine learning offers powerful tools for analyzing complex microstructural features, yet its application is often limited by the lack of sufficiently large experimental datasets.

In this work, we demonstrate that transfer learning from pretrained computer vision models enables accurate quantitative prediction and characterization of defect-related features even from extremely small experimental datasets. We explored various image-based descriptors as inputs to regression models and assessed their predictive performance. Our results show that transfer learning allows extraction of meaningful information about defects from images and supports reliable regression of experimentally measured quantities. This provides a data-efficient strategy for defect characterization in semiconductors and related materials.

In our view, this study aligns with the aims of the Focus Collection, addressing both the scientific challenge of defect analysis and the development of innovative machine learning–based methodologies for materials characterization.

We confirm that this manuscript has not been published previously and is not under consideration by any other journal. No conflict of interest exists in the submission of this manuscript. All authors have approved the final version of the manuscript.

Thank you for considering this manuscript. We look forward to your evaluation.

Sincerely yours,
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