

**SCALE UP ENGINEERING WITH THE TECHNO-ECONOMIC
STUDY OF SCREEN-PRINTED CARBON COUNTER
ELECTRODE-BASED PEROVSKITE SOLAR CELLS**

A Thesis

Submitted

by

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for the award of the degree of

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Declaration by the Research Scholar

This is to certify that the thesis entitled “**Scale up engineering with the techno-economic study of screen-printed carbon counter electrode-based perovskite solar cells**” is submitted to the Indian Institute of Technology Mandi, for the award of the degree of Doctor of Philosophy is a bonafide record of research work carried out by me in the School of Engineering, Indian Institute of Technology Mandi, and in Energy Research Institute, NTU Singapore under the supervision of Dr. Satvasheel Powar and Prof. Nripan Mathews. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

With regard to the general practice of reporting scientific observation, a brief discussion about the findings by other investigators are discussed and acknowledged.

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This is to certify that the thesis entitled “**Scale up engineering with the techno-economic study of screen-printed carbon counter electrode-based perovskite solar cells**” submitted by Miss. Priyanka Kajal to the Indian Institute of Technology Mandi for the award of the degree of Doctor of Philosophy is a bonafide record of research work carried out by her under our supervision in the School of Engineering, Indian Institute of Technology Mandi and Energy Research institute, Nanyang Technological University Singapore. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma. In keeping with the general practice of reporting scientific observation, due acknowledgements have been made wherever the work described is based on the findings of other investigators.



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