Australian Government
Australian Renewable Energy Agency

ARENA

How to significantly reduce the costs associated with commercial PV devices

Project Name: Overcoming the fundamental performance limitations of commercial solar cells

Knowledge Category:	Technical
Knowledge Type:	Technology
Technology Type:	Solar PV
State/Territory:	New South Wales

Key learning

How to significantly reduce the costs associated with commercial PV devices

The costs for making most commercial solar cells are dominated by the costs of the wafers and silver metallisation. Key findings from the present project have been that silver can be replaced by new copper-based technology and expensive silicon wafers can be replaced by much lower cost, but lower quality wafers that can achieve the same efficiencies through the use of the new hydrogen passivation technology.

Implications for future projects

The new technology and tools developed facilitating the use of the new copper-based technology and the ability to transform low cost silicon wafers into an equivalent quality as ones traditionally costing one or two orders of magnitude higher prices should be made available and considered for use in future projects. This has the potential to lead to much lower cost technology without sacrificing performance.

Knowledge gap

Reliability and durability studies need to be conducted to generate understanding and insight into how these new technologies respond in comparison to conventional technology.

Background

Objectives or project requirements

A key objective of this project was to bring down the costs for photovoltaics. This led to the requirement to find alternatives to the use of silver and expensive silicon wafers.

Process undertaken

New ideas were generated for developing new technology for replacing the most expensive materials comprising solar cells. Following extensive experimentation, process development and

technology optimisation, new technologies needed for the use of the new materials became a feasible alternative. The final step in demonstrating the commercial significance of the developments was to design and develop suitable large-scale manufacturing tools for the demonstration of the respective technologies. As part of this process, valuable IP in relation to new technology and tool designs was secured.

Supporting information

Patent PCT PCT/AU2013/000528 “Advanced Hydrogenation of Silicon Solar Cells”, 2013

Also:
US (**divisional**) patent application titled “Advanced Hydrogenation of Silicon Solar Cells” (Application No. 14/5