

InnoModu

Lead free modules with low silver content and innovative bus less cell grid

Project Duration: 10.2014 to 03.2016

Final report submitted: 04.2017

Publishable Summary

InnoModu was an industry-driven research project striving to develop the next generation of photovoltaic (PV) modules. The targets were to drastically minimise the silver content in solar cells and to reduce the share of lead used in a PV module to nearly zero. This would lead to considerable cost and material savings as well as environmental improvements. In addition, the novel technology will allow greater efficiency in the production process with clear market benefits for the industrial partners.

To reach these goals a new PV module was developed in two steps. With the replacement of soldering by *using an electrically conductive adhesive (ECA)* the lead content was eliminated. The gluing process enabled us to use Light Capturing Ribbons (LCR™). Thereby, we were able to demonstrate a power enhancement of 1,7%. The second step was to reduce the silver content in the module significantly. We used PV cells with a galvanic metallisation, which uses only a very thin silver layer as top finishing. We then gradually reduced the silver content of the adhesives used to zero. However, we tried to leave the last silver layer on the galvanic stack and made theoretical designs and calculations to optimise the current collecting fingers of the PV cell.

We were able to demonstrate that it is possible to produce high-quality, lead-free modules and to reduce the silver content. Our method of reducing the silver content is very promising, but it is still a long way to reach the high quality goals necessary to achieve a lifetime of 20 years or more.

The developed process can be run on conventional industry equipment with one additional piece of screen-printing equipment and is ready for series production. A first lead-free PV pilot generator with 5kW has been announced by the industry partners.

Project consortium

Coordinator and contact details:

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Participating countries and financing:

Country	Number of organisations involved	Project costs in EUR	Public funding in EUR
Austria	5	538'984	389'593
Germany	2	268'287	135'644
<i>Total</i>	7	807'271	525'237

Funding agencies involved and contracts

Funding Agency	Contract N° and Title
FFG	844195, InnoModu – Leadfree modules with low silver content and innovative busless cell grid
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FFG	844195, InnoModu – Leadfree modules with low silver content and innovative busless cell grid
PTJ	0325725C, “Verbundvorhaben: Bleifreie Module mit niedrigem Silbergehalt und innovativem busbarlosem Zelldesign (InnoModu); Teilvorhaben Automatisierung Klebeprozess“
PTJ	0325725C, “Verbundvorhaben: Bleifreie Module mit niedrigem Silbergehalt und innovativem busbarlosem Zelldesign (InnoModu); Teilvorhaben Automatisierung Klebeprozess“