

Kaneka, imec develop high-efficiency heterojunction silicon solar cells with copper electroplating

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At the 21st International Photovoltaic Science and Engineering Conference, held on November 28 – December 2 in Fukuoka, Japan, Kaneka and imec present silver-free heterojunction silicon solar cells. The results were obtained by applying copper electroplating technology, which was developed by Kaneka based on imec's existing copper electroplating technology. A conversion efficiency of more than 21% was achieved in 6-inch silicon substrates with an electroplated copper contact grid on top of the transparent conductive oxide layer.

Today, silver screen printing is the technology of choice for the realization of the top grid electrode in heterojunction silicon solar cells. The difficulty of lowering resistivity and thinning the metal line in silver screen printing prevents from achieving high efficiency and low cost. In the presented silver-free approach, the screen-printed silver is replaced by electroplated copper. Formation of top grid electrode with copper-electroplating in hetero-junction silicon solar cells is the world first result. Copper-electroplating is an economical and industry-proven process. This solution not only overcomes the disadvantages of the silver screen printing, but provides advantages such as enabling higher efficiencies and reducing fabrication costs.

These results showing beyond 21% conversion efficiency in heterojunction silicon solar cells based on imec's copper electroplating know how were obtained in a bilateral collaboration between Kaneka

Corporation and imec in Leuven (Belgium). Kaneka's Photovoltaics European Laboratory is located at the imec campus in Leuven (Belgium), giving access to imec's state-of-the-art PV infrastructure and enabling close interaction between imec and Kaneka researchers. The collaboration between Kaneka and imec comprises the improvement of Kaneka's thin-film [solar cells](#) and the development of next-generation heterojunction cells.

Provided by IMEC

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