Process for the production of solar cells having a local back surface field (LBSF)

The present invention relates to a process for the production of solar cells having a local back surface field using printable etching pastes.

Prior art

For the production of silicon solar cells, it is known to coat the latter with a passivating antireflection layer on the front surface and to provide them with metallisation over the entire back surface (back surface field). For this metallisation, use is usually made of an aluminium-based screen-printing paste, which is baked at sintering temperatures > 800°C. The low-melting Al/Si eutectic formed in this sintering process forms an alloy with the silicon surface and has a p-doping action.

In addition, contact points are usually printed on the back surface using silver paste. These are necessary for the soldering of the cells to the module. The back surface busbars printed using silver paste can be applied in strips (below the front surface busbar) and can have twice the width of the front surface busbar.

The back surface design of a standard solar cell is employed in many variants in production.

A description of this technology is given in the publications:
P. Choulat et al; 22nd European Photovoltaic Solar Energy Conference (2007), Milan, Italy
and
G. Agostinelli et al, 20th European Photovoltaic Conference (2005), Barcelona, Spain

In addition, the literature indicates the optimisation of the back surface field through the use of an oxidic passivation layer as replacement for a full-area aluminium layer. The back surface contact here is produced via small dot or

Method for producing solar cells with local back surface field (LBSF)

The present invention relates to a process for the production of solar cells having a local back surface field using printable etching pastes.

Prior art

For the production of silicon solar cells, it is known to coat the latter with a passivating antireflection layer on the front surface and to provide them with metallisation over the entire back surface (back surface field). For this metallisation, use is usually made of an aluminium-based screen-printing paste, which is baked at sintering temperatures > 800°C. The low-melting Al/Si eutectic formed in this sintering process forms an alloy with the silicon surface and has a p-doping action.

In addition, contact points are usually printed on the back surface using silver paste. These are necessary for the soldering of the cells to the module. The back surface busbars printed using silver paste can be applied in strips (below the front surface busbar) and can have twice the width of the front surface busbar.

The back surface design of a standard solar cell is employed in many variants in production.

A description of this technology is given in the publications:
P. Choulat et al; 22nd European Photovoltaic Solar Energy Conference (2007), Milan, Italy
and
G. Agostinelli et al, 20th European Photovoltaic Conference (2005), Barcelona, Spain

In addition, the literature indicates the optimisation of the back surface field through the use of an oxidic passivation layer as replacement for a full-area aluminium layer. The back surface contact here is produced via small dot or