

ABSTRACT

METHOD FOR LOCAL HIGH-DOPING AND CONTACTING OF A SEMICONDUCTOR STRUCTURE WHICH COMPRISES A SOLAR CELL OR A PRECURSOR OF A SOLAR CELL

5 The invention relates to a method for local high-doping and contacting of a semiconductor structure which is a solar cell or a precursor of a solar cell and has a silicon semiconductor substrate (1) of a base doping type. The high-doping and contacting is effected by producing a plurality of local high-doping regions of the base doping type in the semiconductor substrate (1) on
10 a contacting side (1a) of the semiconductor substrate and applying a metal contacting layer (7) to the contacting side (1a) or, if applicable, one or more intermediate layers wholly or partially covering the contacting side (1a), to form electrically conductive connections between the metal contacting layer (7) and the semiconductor substrate (1) at the high doping regions. It is important that the method comprises the following steps: A) producing a layer structure covering the
15 contacting side (1 a) of the semiconductor substrate, comprising a doping layer (3), which contains a dopant of the base doping type and is in the form of a layer of amorphous silicon or a layer of amorphous silicon carbide having a carbon content less than 10 at.% and a reflective layer (4), which at least in the wavelength range between 800 nm and 1200 nm is constructed with a refractive index n_R smaller than the refractive index n_{HS} of the semiconductor substrate, wherein
20 the doping layer (3) lying in the layer sequence closer to the contacting side (1 a) is constructed as the reflective layer (4); B) local heating of layer structure and the surface lying thereunder of the semiconductor substrate at a plurality of zones to form local high-doping regions, wherein the local heating is effected such that at each of the locally heated regions a melt mixture of at least the doping layer (3) and a portion of the semiconductor substrate is formed locally on the contacting
25 side (1 a), and on solidification of the melt mixture a high doping region (6) more strongly doped by at least the dopant of the doping layer (3) is formed in the semiconductor substrate (1) on the contacting side (1 a), and applying a metal contacting layer (7) to form an electrically conductive connection between semiconductor substrate (1) and contacting layer (7) at the high-doping regions.

30 The most illustrative drawing: Fig. 1