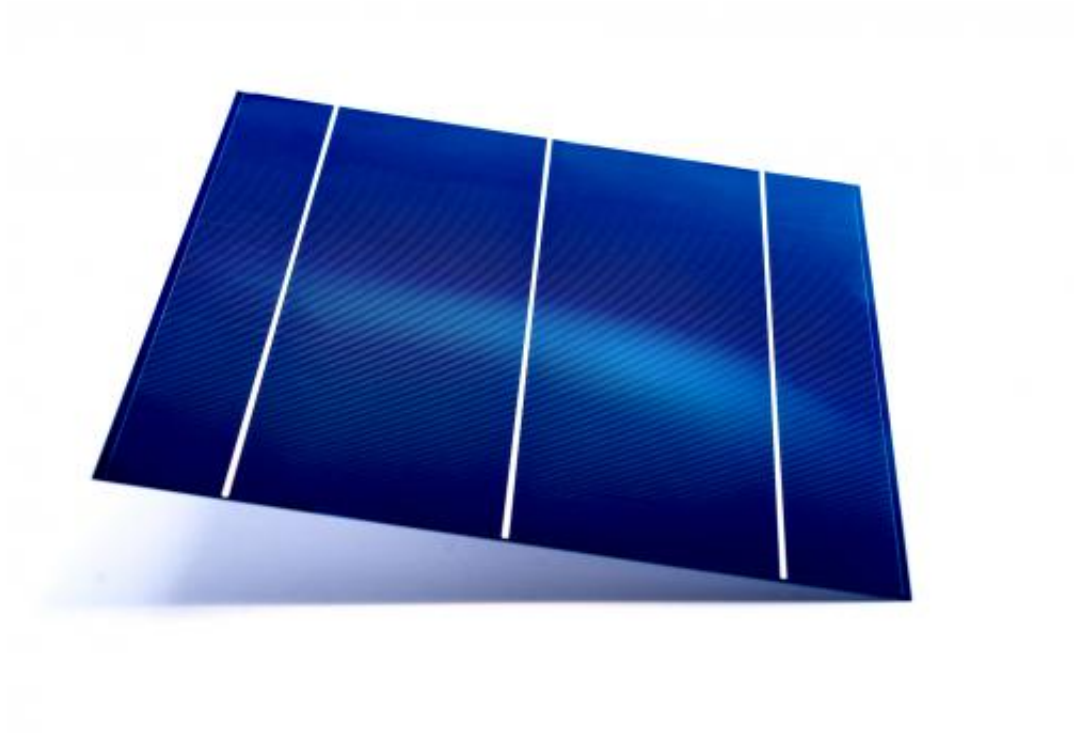
# Record efficiency for large area industrial crystalline-silicon N-pert solar cell

July 8 2014, by Hanne Degans



Nano-electronics research center imec, reported today an n-type PERT crystalline silicon (Si) solar cell fabricated on a large area wafer (15.6cm x 15.6 cm) reaching a top conversion efficiency of 21.5 percent (calibrated at ISE Callab). This is the highest efficiency achieved for this type of solar cell on an industrial large area wafer size. This result will

accelerate the adoption of n-type PERT (Passivated Emitter, Rear Totally diffused) solar cells in the industry as it clearly shows the potential for improved conversion efficiencies for next generation standard two side contacted crystalline silicon solar cells. Additionally imec researchers showed recently that n-type PERT solar cells of imec, having a rear emitter, are not affected by reliability risks originating from a front Ni/Cu plated metallization.

The cell reaching this 21.5 percent conversion efficiency had an open circuit voltage (Voc) of 677mV, a short circuit current (Jsc) of 39.1 mA/cm2, and 81.3% fill factor, and features a rear blanket p+ emitter obtained by boron diffusion. Reliable front metal contacts on an n+ front-surface-field are formed by means of Ni/Cu/Ag plating (3 bus bars grid) using an industrial plating tool from Meco, while the rear local contacts to the p+ emitter were obtained by laser ablation of the rear passivation stack and subsequent physical-vapor-deposition of aluminum. The rear passivation stack includes a thin (