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(54) **ADVANCED HIGH EFFICIENTCY
CRYSTALLINE SOLAR CELL FABRICATION
METHOD**

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(75) Inventors: **Babak Adibi**, Los Altos, CA (US);
Edward S. Murrer, Aptos, CA
(US); **Henry Hieslmair**, San
Francisco, CA (US)

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(73) Assignee: **SOLAR IMPLANT
TECHNOLOGIES, INC.**,
Mountain View, CA (US)

(57) **ABSTRACT**

A method of fabricating a solar cell comprising: providing a semiconducting wafer having a front surface, a back surface, and a background doped region; performing a set of ion implantations of dopant into the semiconducting wafer to form a back alternatingly-doped region extending from the back surface of the semiconducting wafer to a location between the back surface and the front surface, wherein the back doped region comprises laterally alternating first back doped regions and second back doped regions, and wherein the first back doped regions comprise a different charge type than the second back doped regions and the background doped region; and disposing a back metal contact layer onto the back surface of the semiconducting wafer, wherein the back metal contact layer is aligned over the first and second back doped regions and is configured to conduct electrical charge from the first and second back doped regions.

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