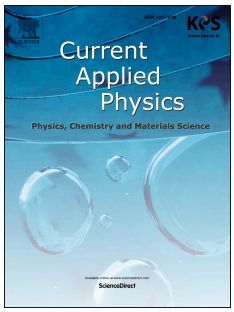
Accepted Manuscript



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PII: S1567-1739(17)30333-4

DOI: 10.1016/j.cap.2017.11.024

Reference: CAP 4639

To appear in: *Current Applied Physics*

Received Date: 5 August 2017

Revised Date: 22 November 2017

Accepted Date: 30 November 2017

Please cite this article as: D. Suh, Efficient implementation of multiple drive-in steps in thermal diffusion of phosphorus for PERC solar cells, *Current Applied Physics* (2017), doi: 10.1016/j.cap.2017.11.024.

Efficient implementation of multiple drive-in steps in thermal diffusion of phosphorus for PERC solar cells

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ABSTRACT

N-type phosphorus diffusion in silicon using phosphorus oxychloride, $POCl_3$, has been widely used in the production of p-type silicon solar cells. The thermal diffusion process in a furnace generally involves two steps: pre-deposition and drive-in. The phosphorous doping by thermal diffusion often shows high surface concentrations, leading to an increase in charge recombination, which should be inhibited in order to fabricate high efficiency silicon solar cells. In this study, we investigate the influence of 3 drive-in steps at sequentially increasing temperatures during the $POCl_3$ diffusion on the emitter performance. As a result, it was found that the kink region was made shorter while maintaining surface concentration for a good metal contact without losing its