

## Optimization of Laser Doping Selective Emitter for Silicon Solar Cells

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**Abstract :** Laser doping has a large potential for integration into silicon solar cell technologies. The ability to process local, heavily diffused regions in a self-aligned manner can greatly simplify processing sequences for the fabrication of selective emitter. The choice of laser parameters for a laser doping process with 532nm is investigated. Solid state lasers with different power and speed were used for laser doping. In this work, the aim is the formation of selective emitter solar cells with a reduced number of technological steps. In order to have a highly doped localized emitter region, we used a 532 nm laser doping. Note that this region will receive the metallization of the Ag grid by screen printing. For this, we use SOLIDWORKS software to design a single type of pattern for square silicon cells. Sheet resistances, phosphorus doping concentration and silicon bulk lifetimes of irradiated samples are presented. Additionally, secondary ion mass spectroscopy (SIMS) profiles of the laser processed samples were acquired. Scanning electron microscope and optical microscope images of laser processed surfaces at different parameters are shown and compared.

**Keywords :** laser doping, selective emitter, silicon, solar cells

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