

Investigation of XeF₂ dry etching for contact isolation of screen printed IBC solar cell

Abstract

We demonstrated the use of Xenon Difluoride (XeF₂) plasma less vapor etching for isolation of n and p regions in screen-printed interdigitated back contact (IBC) solar cell. The fabrication process is free from lithography process and carried out using standard conventional silicon solar cell equipment. A p-type CZ wafer was used as the starting material and POCl₃ furnace was used to form the emitter. Silver and Aluminum pastes were screen printed to form emitter and base contacts respectively. An automated XeF₂ vapor etching system was used for blanket etching of doped region between emitter and base metal contacts. Solar cell LIV response was measured as a function of XeF₂ etching. Open-circuit increased as a function of XeF₂ etching indicating removal of doped silicon; however, solar cell response was poor presumably due to large un-passivated, junction-free regions between positive and negative contacts. In order to improve performance, an extra alignment step is needed to etch small regions only.

Keywords; IBC solar cell; XeF₂ vapor etching; Screen-printed