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(57) Abstract :
The present disclosure relates to a silicide on oxide-based electrostatically doped (SILO-ED) carrier selective contact-based passivated emitter and rear contact (PERC) photovoltaic device. The device includes an upright pyramid-based textured PERC solar cell to enhance light trapping within the substrate. Further, Erbium silicide (ErSi2) having a work function m=3 eV is used, where, ErSi2 is directly deposited onto an interfacial oxide layer to avoid the need for actual physical doping. The interfacial oxide layer is SiO2 of thickness 1.5 nm for tunneling of charge carriers. The front surface of the device includes dielectric stacks of SiNX (70 nm)/SiO2 (10 nm) materials, which are used for antireflection coating and front surface passivation by reducing the optical and front side recombination loss. Further, the rear surface of the device includes dielectric stacks of Al2O3 (50 nm)/SiO2 (40 nm) materials, which are used for rear surface passivation by reducing the recombination of charge carriers.

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