High-quality *p*-type emitter using boron aluminum source for *n*-type TOPCon solar cells

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Highlights

• Experimental procedures were employed to fabricate boron-aluminum doped *p-n* junctions on n-type silicon wafers for utilization as a front emitter in TOPCon cells.

• The experimental outcomes demonstrate that the *p*-type layer, obtained by co-diffusion, can achieve a surface doping concentration of $3.18x10^{19}cm^{-3}$ and a maximum doping concentration of $5.36x10^{20}cm^{-3}$ at 900°C.

• The performance parameters of the boron-aluminum doped *p*-type layer TOPCon cell were computed using the Quokka3 simulation software.

• Quokka3 simulation results show that the efficiency of TOPCon solar cells prepared with boron-aluminum source is 0.43% higher than that of conventional TOPCon solar cells.

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