

## Simulation and Analysis of Effect of Halide Ions of Perovskite-on-Perovskite Solar Cells Performance

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Perovskite solar cells (PSCs) have attracted significant interest of scientists as well as industrialist as the latest generation of solar cells due to their sky rocketing performances. In this study, the effect of Halide Ions of perovskite on PSCs performances were studied using solar cell capacitance simulator (SCAPS). Perovskite solar cells with  $\text{MAPbI}_3$  and PSCs with  $\text{MAPbBr}_3$  as the light-absorbing materials have been simulated and compared the effect of the halide ion on solar cell performances. The efficiency of  $\text{MAPbI}_3$  and  $\text{MAPbBr}_3$  were reached 16.8% and 5.1% respectively. Also, the thickness of each  $\text{MAPbI}_3$  and  $\text{MAPbBr}_3$  was varied from 0.1  $\mu\text{m}$  to 1.2  $\mu\text{m}$  and the best results were observed at 0.5  $\mu\text{m}$  and 0.4  $\mu\text{m}$  thickness of  $\text{MAPbI}_3$  and  $\text{MAPbBr}_3$  films, respectively. A considerable effect of halide ions on PSC performances has been observed and it can be attributed to the variation of light absorption with the halide ions.

**Keywords:** perovskite solar cells, Halide Ions, performances, thickness