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## Enhanced photovoltaic performance of $\text{Sb}_2\text{S}_3$ -sensitized solar cells through surface treatments

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### Abstract

Efficient antimony sulfide ( $\text{Sb}_2\text{S}_3$ )-sensitized solar cells were obtained by a sequential treatment with thioacetamide (TA) and 1-decylphosphonic acid (DPA). Compared with the untreated  $\text{Sb}_2\text{S}_3$ -sensitized solar cells, the power conversion efficiency of the treated  $\text{Sb}_2\text{S}_3$  solar cells was improved by 1.80% to 3.23%. The TA treatment improved the  $\text{Sb}_2\text{S}_3$  films by reducing impurities and decreasing the film's surface defects, which inhibited the emergence of recombination centers. The DPA treatment reduced the recombination between hole transport materials (HTMs) and the  $\text{Sb}_2\text{S}_3$ .

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