

Analysis of metal nano-particle embedded silicon nitride thin-films for anti-reflection coating (ARC) in solar cell applications

R.M PUJAHARI^{1,*}, S K.RATHA², C K DAS² and M C ADHIKARY²

¹ABESIT, Ghaziabad, India

²Dept. of Applied Physics and Ballistics, F M University, Balasore, India*Corresponding author, E-mail: rpujahari@gmail.com

Received: 22.11.2018 ; Revised : 12.12.2018 ; Accepted : 5.1.2019

Abstract. Anti-reflection coatings (ARC) find viable application in commercial silicon solar cell technology. Most of the solar cell production companies around the world use titanium dioxide, silicon dioxide or silicon nitride thin films as ARC. In this work a study is done to find out the effect of embedded metal nano-particles (NP) in the widely used ARC material (Silicon Nitride) for silicon solar cells. It is shown that the theoretical treatment may be performed for designing such metal nano-particle embedded anti-reflection coatings. A comparative study of silicon nitride ARC without embedded metal nano-particles and silicon nitride ARC with embedded metal nano-particles is made in this article. The chosen values of parameters are well within the technological limits of present time.

Keywords. Antireflection coating, silicon nitride, solar cells, metal nano-particles.

[\[Full Paper \]](#)