

ABSTRACT:

Application of thin films of SiO₂ and TiO₂ using the sol-gel process were utilized as antireflection coating on monocrystalline silicon wafers. The aim of this study is to validate this process as a procedure to prepare antireflective films for monocrystalline silicon by dip-coating. The coating was carried out by dip-coating process using tetraethoxysilane (TEOS) as precursor for SiO₂ and titanium isopropoxide (TIPT) as precursor for TiO₂. In order to study the influence of the thickness on the reflectance and the optical parameters, several coatings with different thickness were deposited onto silicon wafers. The refractive index and the thickness were adjusted by controlling the number of dipping. The refractive index increases from 2.10 up to 2.22 by increasing the film thickness from 36 to 137 nm. It was found that the sample coated with two layers exhibits a lower reflection (1.86 % at $\lambda = 602$ nm). This result was improved by a single sublayer of SiO₂ (36.75 nm) to reach 1.08 % at $\lambda = 674$ nm). Furthermore, the low values of the extinction coefficient (k) (approach to Zero at $\lambda = 632.8$ nm) indicate that TiO₂ and SiO₂ films deposited by sol-gel method can be used as ARC for Si solar cells