

## 성장각도에 따른 주상구조 ZnO 박막의 광학적 특성

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## The optical properties of columnar structure according to the growth angles of ZnO thin films

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**Abstract :** The most important part of the fabrication solar cells is the anti-reflection coating when excludes the kinds of silicon substrates (crystalline, polycrystalline, or amorphous), patterns and materials of electrodes. Anti-reflection coatings reduce the reflection of sunlight and at last increase the intensity of radiation to inside of solar cells. So, we can obtain increase of solar cell efficiency about 10% using anti-reflection coating. There are many kinds of anti-reflection film for solar cell, such as SiN, SiO<sub>2</sub>, a-Si, and so on. And, they have two functions, anti-reflection and passivation. However such materials could not perfectly prevent reflection. So, in this work, we investigated the anti-reflection coating with the columnar structure ZnO thin film. We synthesized columnar structure ZnO film on glass substrates. The ZnO films were synthesized using a RF magnetron sputtering system with a pure (99.95%) ZnO target at room temperature. The anti-reflection coating layer was sputtered by argon and oxygen gases. The angle of target and substrate measures 0, 20, 40, 60 degrees, the working pressure 10 mtorr and the 250 W of RF power during 40 minutes. The confirm the growth mechanism of ZnO on columnar structure, the anti-reflection coating layer was observed by field emission scanning electron microscopy (FE-SEM). The optical trends were observed by UV-vis and Elleso meter.

**Key Words :** anti-reflection, columnar structure, ZnO