

실리콘 박막 태양전지용 텍스처링 ZnO:Al 박막 개발

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Development of textured ZnO:Al films for silicon thin film solar cells

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Abstract : High quality ZnO:Al films were prepared on glass substrates by in-line RF magnetron sputtering and their surface morphologies were modified by wet-etching process in dilute acid solution to improve optical properties for application to silicon thin film solar cells as front electrode. The as-deposited films show a strong preferred orientation in [001] direction under our experimental conditions. A low resistivity below $5 \times 10^{-4} \Omega \text{ cm}$ and high optical transmittance above 80% in a visible range are achieved in the films deposited at optimized conditions. After wet-etching, the surface morphologies of the films are changed dramatically depending on the deposition conditions, especially working pressure. The optical properties such as total/diffuse transmittance, haze and angular resolved distribution of light are varied significantly with the surface morphology feature, whereas the electrical properties are seldom changed. The cell performances of silicon thin film solar cells fabricated on the textured films are also evaluated in detail with comparison of commercial SnO₂:F films.

Key words : ZnO:Al film(산화아연 박막), Silicon thin film solar cell(실리콘 박막 태양전지), Haze(산란도), Surface morphology(표면형상)

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