

수소화된 비정질 실리콘 박막을 이용한 웨이퍼 패시베이션 특성 연구

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A study on wafer surface passivation properties using hydrogenated amorphous silicon thin film

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Surface passivation of crystalline silicon(c-Si) surface with a-Si:H thin films has been investigated by using quasi-steady-state photo conductance(QSSPC) measurements. Analyzing the influence of a-Si:H film thickness, process gas ratio, deposition temperature and post annealing temperature on the passivation properties of c-Si, we optimized the passivation conditions at the substrate temperature of 200-250°C. Best surface passivation has been obtained by post-deposition annealing of a-Si:H film layer. Post annealing around the deposition temperature was sufficient to improve the surface passivation for silicon substrates. We obtained effective carrier lifetimes above 5.5 ms on average.

Key words : Surface passivation(표면 패시베이션), Hydrogenated amorphous silicon(수소화된 비정질 실리콘), Effective minority carrier lifetime(유효 소수반송자 수명)

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박막형 실리콘 태양전지 적용을 위한 투명전도막 특성 연구

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A study on TCO properties for thin-film silicon solar cells

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For use of superstrate thin-film solar cells, surface texture of the transparent conductive oxide (TCO) has been used to enhance short-circuit currents by increasing light trapping into the cell. ZnO:Al films were deposited by using DC magnetron sputtering on glass substrates with ceramic (ZnO:Al₂O₃) target. The as-deposited TCO before texturing exhibited high transparencies ($T > 85\%$ for visible light including all reflection losses) and excellent electrical properties ($r = 3-6 \times 10^{-4} \Omega \cdot \text{cm}$). The optical and electrical properties of the TCO are influenced by the texturing conditions such as not only etchant dilutions but also etching time. We obtained the haze value of 14-16 resulting in increase in light trapping and short-circuit currents also.

Key words : TCO(투명전도막), Thin film silicon solar cells(박막 태양전지) ZnO:Al film(알루미늄이 도핑된 산화아연 투명 전도막)

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