태양광 모듈의 후면 Back sheet의 특성 및 온도 변화에 따른 전기적 출력 특성 변화

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Electrical output of PV Module according to characteristics and variation Temperature of backsheet

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태양광 모듈의 효율 증가를 위한 고효율태양전지개발, 광투과율향상, 모듈의 대형화 등 많은 연구개발이 이루어지고 있다. 이중 우리는 태양광 모듈의 후면 sheet인 Back sheet의 특성 및 온도 변화에 따른 모듈의 전기적 출력 특성 변화에 대한 연구를 실시하였다. Back sheet의 두께, 재질, 색상 등 종류는 다양하다. 여기서는 백시트의 색상을 중점으로 White, Blue, Black 3가지와 Glass까지 총 4가지 종류를 가지고 반사율을 측정하고, 모듈화 했을 때 출력을 비교하였다. 그리고 온도별로 효율값을 측정하여 백시트의 색상 종류에 따라서 어떠한 차이가 있는지 비교하였다.

Key words : Photovoltaic(태양광), PV module(태양전지 모듈), Back sheet, reflectivity, total reflection

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PECVD로 제조된 나노결정실리콘 비선형 광학적특성

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Non-linear optical properties of PECVD nanocrystal-Si nanosecond excitation

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A study of the non-linear optical properties of nanocrystal-Si embedded in SiO2 has been performed by using the z-scan method in the nanosecond and femtosecond ranges. Substoichiometric SiOx films were grown by plasma-enhanced chemical-vapor deposition(PECVD) on silica substrates for Si excesses up to 24 at/%. An annealing at 1250℃ for 1 hour was performed in order to precipitate nanocrystal-Si, as shown by EFTEM images. Z-scan results have shown that, by using 5-ns pulses, the non-linear process is ruled by thermal effects and only a negative contribution can be observed in the non-linear refractive index, with typical values around -10-10cm^2/W. On the other hand, femtosecond excitation has revealed a pure electronic contribution to the nonlinear refractive index, obtaining values in the order of 10-12 cm2/W. Simulations of heat propagation have shown that the onset of the temperature rise is delayed more than half pulse-width respect to the starting edge of the excitation. A maximum temperature increase of △T=123.1℃ has been found after 3.5ns of the laser pulse maximum. In order to minimize the thermal contribution to the z-scan transmittance and extract the electronic part, the sample response has been analyzed during the first few nanoseconds. By this method we found a reduction of 20% in the thermal effects. So that, shorter pulses have to be used obtain just pure electronic nonlinearities.

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Key words : a-Si, photoelectron, PECVD, heterostructures.

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