

RF 마그네트론 스퍼터로 증착시킨 ITO 박막의 열화 특성에 관한 연구
Degradation characteristics of ITO thin film deposited by RF magnetron sputter

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Indium tin oxide(ITO) is an advanced ceramic material with many electronic and optical applications due to its high electrical conductivity and transparency to light. ITO thin films are used in transparent electrodes for display devices, transparent coatings for solar energy heat mirrors and windows films in n-p heterojunction solar cells, etc.

Almost all display devices were fabricated on transparent ITO electrode substrates. There are several factors that cause decay in the efficiency and the failure of display devices. The degradation or damage of ITO is one of the main factors. Under normal operating conditions, the electric field required for the operation of display devices is very high. As a high electric field induces the joule heat, the degradation of the ITO thin film may be expected. Therefore, it is worthy to investigate the thermal and electrical effect on ITO thin films.

In this study, we report our study of the degradation characteristics of ITO thin films under accelerated degradation condition. ITO thin film was deposited by RF magnetron sputtering. From the accelerated degradation test with stress factor of temperature and voltage, the lifetime estimate, degradation rate/degree, activation energy and etc. were calculated. And it was showed that the prominent failure mechanism was the decrease of oxygen vacancies due to oxidation of ITO thin film.