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임피던스 측정법을 이용한 엑시머 레이저 열처리 Poly-Si의 특성 분석
APPLICATION OF IMPEDANCE SPECTROSCOPY TO POLYCRYSTALLINE SI PREPARED BY EXCIMER LASER ANNEALING

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Abstract
Polycrystalline Si(polysilicon) TFTs have opened a way for the next generation of display devices, due to their higher mobility of charge carriers relative to a-Si TFTs. The polysilicon TFT applications extend from the current Liquid Crystal Displays to the next generation Organic Light Emitting Diodes (OLED) displays. In particular, the OLED devices require a stricter control of properties of gate oxide layer, polysilicon layer, and their interface. The polysilicon layer is generally obtained by annealing thin film a-Si layer using techniques such as solid phase crystallization and excimer laser annealing. Typically laser-crystallized Si films have gran sizes of less than 1 micron, and their electrical/dielectric properties are strongly affected by the presence of grain boundaries. Impedance spectroscopy allows the frequency-dependent measurement of impedance and can be applied to interface-controlled materials, resolving the respective contributions of grain boundaries, interfaces, and/or surface. Impedance spectroscopy was applied to laser-annealed Si thin films, using the electrodes which are designed specially for thin films. In order to understand the effect of grain size on physical properties, the amorphous Si was exposed to different laser energy densities, thereby varying the grain size of the resulting films. The microstructural characterization was carried out to accompany the electrical/dielectric properties obtained using the impedance spectroscopy. The correlation will be made between Si grain size and the corresponding electrical/dielectric properties. The ramifications will be discussed in conjunction with active-matrix thin film transistors for Active Matrix OLED.