

타원법을 이용한 Super-RENS 용 AgOx mask 층의 광물성 연구

Ellipsometric Investigation of Optical Property of AgOx mask layer for Super-RENS Application

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To increase the high-density data storage, a new technique of Super-resolution near-field structure (Super-RENS) consisted of glass/SiN/Sb or AgOx/SiN has been proposed and investigated intensively as a promising structure for near-field ultrahigh-density optical storage.^{1,2,3} Hence it is important to determine the optical properties of AgOx by using ellipsometry. AgOx thin films were prepared by using magnetron sputtering technique while oxygen flow rate was varied, and the film growth of AgOx were monitored by using in situ ellipsometer. The optical constants of as-deposit AgOx were determined by spectroscopic ellipsometry. The temperature dependence of AgOx was observed in term of α , β by single wavelength ellipsometry. The variation of optical constants is discussed versus oxygen composition in AgOx.

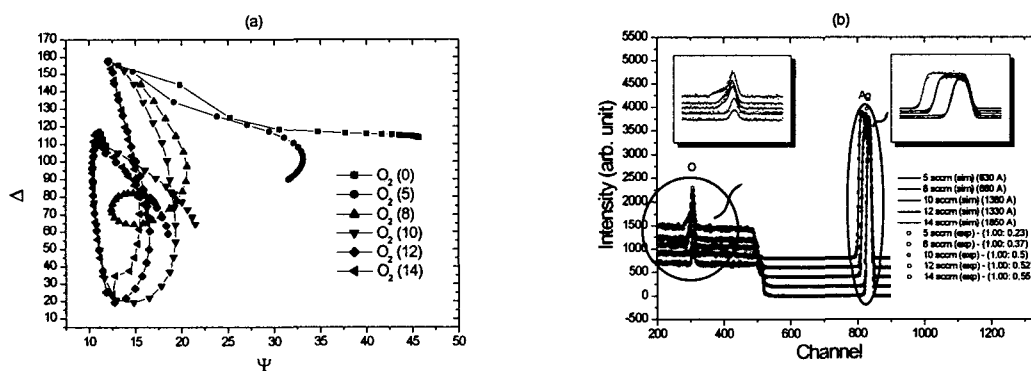


Figure 1. (a) The growth curve of AgOx monitored in real time by using ellipsometry with different oxygen flow rate. (b) The composition of AgOx were measured using Rutherford Back Scattering spectroscopy(RBS).

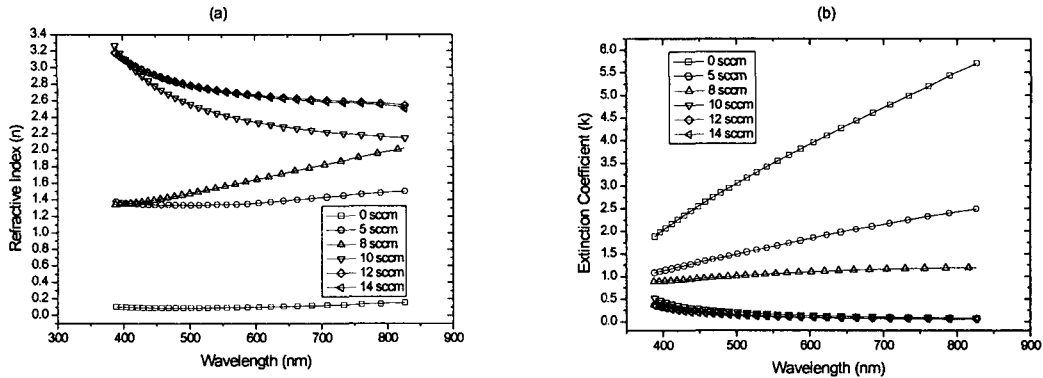


Figure 2. The refractive index (a) and the extinction coefficient (b) of AgOx determined by using spectroscopic ellipsometry.

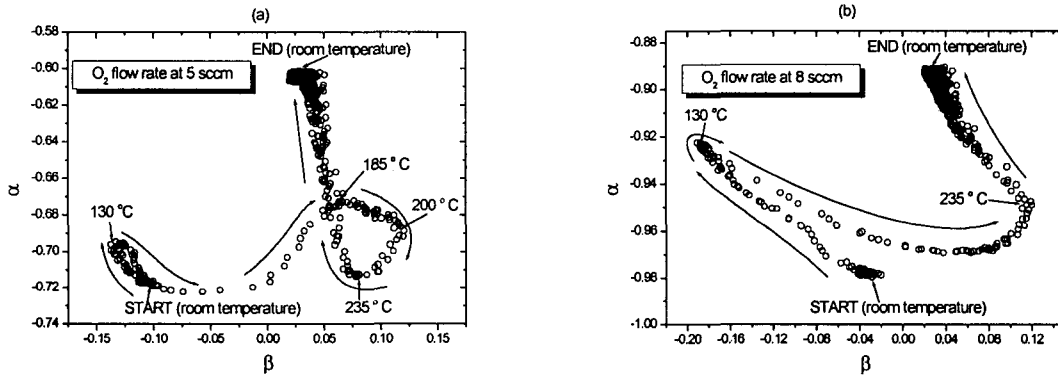


Figure 3. The temperature dependence of ellipsometric constants α , β , (a) oxygen flow rate at 5 sccm, (b) oxygen flow rate at 8 sccm.

참고문헌:

1. J. Tominaga, T. Nakano, N. Atoda "An approach for recording and readout beyond the diffraction limit with an Sb thin film", Appl. Phys. Lett., 73(15), 2078 (1998).
2. Liqun Sun, Tao Hong Jia, Wang Qian Tian "Numerical simulation of electromagnetic propagation in super-resolution near-field structure", SPIE Vol. 4342, 328-331 (2002).
3. Hiroshi Fuji, Junji Tominaga, Liqiu Men, Takashi Nakano, Hiroyuki Katayama Nobufumi Atoda "A Near-Field Recording and Readout Technology Using a Matallic Probe in an Optical Disk", Jpn. J. Appl. Phys Vol. 39, 980-981 (2000).