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CHARACTERIZATION of $Cu(In_xGa_{1-x})Se_2$ THIN FILM BY CO-EVAPORATION METHOD, S. H. KWON, D. Y. LEE and B. T. AHN (Dept. of Materals Science and Engineering, KAIST, Taejon, 305-701, Korea), S. K. KIM, J. C. LEE, K. H. YOON and J. SONG (Photovoltaic research team, KIER, Taejon, 305-343, Korea)

$Cu(In_xGa_{1-x})Se_2$ (CIGS) thin films were prepared and characterized for photovoltaic applications. The CIGS films were prepared by the sequential coevaporation of In-Ga-Se, Cu-Se, and In-Ga-Se from elemental sources. As the Ga content increases, the grain size of CIGS film becomes smaller. The 2θ values in XRD patterns are shifted to larger values and the overlapped peaks are splitted, indicating that the c/a ratio decreases. The energy bandgap increases from 1.04 to 1.67 eV and the resistivity decreases.

Solar cell fabricated with a $ZnO/CdS/C(In_{0.7}Ga_{0.3})Se_2$ /Mo structure yields an efficeincy of 14.48% with an acitive area of $0.18cm^2$. The efficiency decreases with further increase of Ga content.

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EFFECT OF PHOTO IRRADIATION ON THE REFRACTIVE INDICES OF SPIROBENZOPYRAN POLYMER FILM, EUNKYOUNG KIM AND YOON-KI CHOI (Advanced Materials Division, KRICT, P. O. Box107, Yusung, Taejeon, 305-600, South Korea), MYUNG-HYN LEE AND SEON GYU Han (Photonic Switching Section, ETRI, 161 Kajong-Dong, Yusung, Taejeon, 305-350), SAM-ROK KEUM (Dept. of Chemistry, Graduate studies of Korea University, Seoul, Korea 136-701).

Effect of photo irradiation on the refractive index of spirobenzopyran (SP) in a polymer matrix was investigated. Spirobenzopyran-g-polymer, GSP, was prepared by a radical polymerization using 6-(methacryloyloxy)substituted-spirobenzopyrane. Films of SP doped or GSP showed color change from pale yellow to deep blue upon irradiation of a monochromatic light of 340 nm. The colored films were bleached spontaneously or by a light of 580 nm. A TE polarized diode laser (1.3 m) was used to monitor the refractive indices and their changes upon photo irradiation. The refractive index change of SP films was on the order of 10^{-3}, which was highly dependent on the irradiation time and the structure of SP. Effects of the polymer matrix on the refractive index change of spirobenzopyran molecules and application potential of the photochromic films will be presented.

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PROPERTIES OF AMORPHOUS WNx THIN FILMS PREPARED BY RF MAGNETRON SPUTTERING, K.Y. HAN and BYUNG HO CHOI(School of Mat. & Met. Eng, Kumoh National University of Technology, Kyungbuk, 730-701, Korea)

Tungsten nitride is very attractive as an absorber for X-ray lithographic masks and as a diffusion barrier for interconnecting metallization in VLSI technology. In order to obtain finer feature size on X-ray masks, microstructure and etching profiles of absorber materials are critical considerations. Amorphous WNx thin film, whose surface is very smooth, can be prepared at N_2/Ar gas ratio(~0.1/0.9), working pressure (~10mTorr), and RF power density (~3.3W/㎠) by RF magnetron sputtering. The possibility of the anisotropic etching of the film is investigated as a function of additive gas CHF_3 and reactive ion etching parameters. Anisotropic etching of the film is achieved at CHF_3/SF_6 gas ratio (~0.5/0.5 in Ar), working pressure (~200mTorr) and RF power density (~0.39W/㎠). From the analysis of the XPS data, it is concluded that anisotropic profiles are caused by the inhibitor composed of carbon compounds on the side wall of WNx thin films.

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GROWTH AND CHARACTERIZATION OF RF MAGNETRON SPUTTERED AlN/SiO_2/Si(100) THIN FILMS, HYUNG T. KIM (Dept. of Matl's Sci. & Eng., Univ. of Inchon, Inchon, 402-749, Korea) J. H. Whang, W. H. Chung, S. Y. Choi, I. H. Park and M. H. Kwon (Dept. of Physics, Univ. of Inchon, Inchon, Korea)

In this study, the effects of deposition parameters on some properties of AlN films were investigated. Degree of the c-axis oriented crystallization and crystallinity, microstructure of grain growth, surface morphology and flatness were observed by XRD, SEM, TEM and AFM. The refractive index was also measured as the function of thickness and crystalline orientation by ellipsometry. The characterized properties of AlN films were significantly dependent upon the sputtering pressure, nitrogen partial pressure, RF power, substrate and adatom's mobility. The optimum degree of probed film properties was obtained under the deposition pressure at 5-6 mTorr, applied RF power of 300W, and about 33% of N_2 concentrations without substrate heating. The c-axis lattice constant was estimated about 4.98Å by XRD knocking curve. And the dense micro-grain growth of 80Å size was also observed. Refractive index was measured as 2.1 from film thickness of 1 μm which is suitable value to device fabrication. The obtained refractive index of polycrystalline AlN film was close to that of single crystalline AlN film. Observed degree of the surface flatness was also applicable to BAW device. AlN film deposited on Corning glass showed the similar properties of AlN film on SiO_2/Si(100) substrate. Especially about the degree of c-axis orientation and micro-grain growth, AlN film on Corning glass showed the superior properties.

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