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## Characterization of Non-hydrolytic Sol-gel Methacrylate-silica Hybrid Material for Optical Waveguide Fabrication

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Due to the economic merits based on a simple fabrication process, optical waveguide devices have been actively studied and developed for low cost mass production UV embossing processes for polymer-based materials are suited to profit mass production of optical waveguide A special advantage of UV embossing is low temperature and low pressure process compared with other fabrication methods, e g hot embossing And another passive alignments also can be fabricated with the waveguide in one step However, until now the commercial application of polymer waveguide is limited because of high optical loss and temperature-dependences Instead of polymers, the organic-inorganic hybrid material has high temperature resistance (until around 300°C) and has low optical loss obtained by non-hydrolytic sol-gel process and also has very low birefringence

The solution of non-hydrolytic sol-gel method is used toproduce thin films of low loss photo-patternable hybrid organic-inorganic polymeric glass on silicon Because of cooking sol-gel solution without water, there is very low quantity of silanol group (Si-OH), which is a main cause of optical loss, in non-hydrolytic sol-gel hybrid MD material Glasses consist of photo-initiator, methacryloxyprolpyl-trimethoxysilane (MPTMS), diphenyl silanediol (DPSD) are suitable for fabricating optical components such as ridge waveguides by using UV-based embossing method. The used photo-initiators are 2,2-Dimethoxy-2-phenylacetophenone (Benzildimethylketal BDK), 2-Benzyl-2-(dimethylamino)-4'-morpholinobutyrophenone (Irg369) These films showed both refractive index and thickness change after selective UV irradiation and drying Through UV-based embossing method, the patterned films can be used fabricating devices without development process.

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## $GeTe/Sb_2Te_3$ 다층 상변화박막의 열처리에 따른 전기적 · 광학적 특성 평가

## Electrical and Optical Properties of Heat-treated Phase-change $GeTe/Sb_2Te_3$ Multi-layer Thin Film

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Ge-Sb-Te계 chalcogenide 소재는 상변화 광디스크의 기록매체로 널리 사용되고 있고, 최근 PRAM의 메모리소재로 응용하기위한 활발한 연구가 이루어지고 있다 현재 상변화 광디스크이 기록매체로 사용중인 $Ge_2Sb_2Te_5$ 소재의 상전이 속도를 향상시키고 상전이시 필요한 소비전력을 낮추기 위하여 2원계 chalcogenide 소재를 교번 증착한 다층 상변화박막이 제안되고 있으나, 다층박막 제조조건에 따른 광학적 · 전기적 물성변화에 관한 연구는 거의 이루어지지 않고 있는 실정이다

본 연구에서는 E-beam evaporator를 이용하여 $GeTe/Sb_2Te_3$ 다층 상변화박막을 제조하였고, 다층박막 제조조건 및 열처리에 따른 상변화 특성 및 전기적 · 광학적 특성변화를 관찰하였다 박막의 조성은 EPMA와 ICP-AES로 확인하였으며, 다층박막의 적층 순서 및 적층 수에 따른 면저항, 반사율 및 optical bandgap을 4-point probe, UV-VIS-NIR spectrophotometer 및 VASE로 분석하였다.