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Room-temperature Preparation of Al_2O_3 Thick Film by Aerosol Deposition and Simulation of 10 GHz-LC Filter for Integrated RF Module

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Active and passive electronic components have been required to be miniaturized and operated at high frequencies for mobile and microwave devices For the further down-sizing of them with high functions, it is indispensable to integrate both active and passive devices simultaneously in the form of 3-dimensional multilayer-structured modules In this study, Aerosol Deposition Method(ADM) will be proposed as a new technology of promise for the integrated RF modules Al_2O_3 thick films were deposited on glass or Al substrates at room temperature using 0 4 μm-diameter α-Al_2O_3 powders by ADM. 10 μm-thick nanocry stalline α-Al_2O_3 films with good transparency could be obtained with the rate of about 1 ?m/min without any heat treatments Relative dielectric permittivity and loss tangent of the Al_2O_3 thick films on Al showed 9 5 and 0 005 as good as the values of bulk ceramics, respectively For a transmission line with 50 Ω-characteristic impedance, the patterning process with 11 μm-line width was performed by the lift-off method using electron-beam lithography and Pt sputtering On the patterned Pt/Al_2O_3/Al substrates, Cu-metal transmission lines with 5 μm-thick and sharp edges were successfully formed by electroplating Low-pass filters with 10 GHz cut-off frequency were simulated by an electromagnetic analysis software (Sonnet Suite 8 0) so that it exhibited the validity of ADM as a co-integration technology for integrated RF modules.

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니켈전극을 이용한 탄화규소 쇼트키 다이오드 제작 및 수소 플라즈마 처리 효과에 관한 연구

Fabrication of the Ni/SiC Schottky Barrier Diode -The Effect of Post H_2 Plasma Treatment

김대환, 나훈주, 정재경, 엄명윤, 송호근, 정상용, 김형준
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탄화규소 (SiC)는 고온에서의 우수한 안정성과 광역 에너지 금지대역 (2 3~3 2 eV), 높은 파괴전압 (5×10^6 Vcm^{-1}), 큰 포화이동속도 (2 5×10^7 cms^{-1})등의 우수한 전기적 특성으로 인하여 고온, 고출력, 고주파 영역에서 작동되는 소자의 재료로서 많은 연구가 진행되어 왔다.

제작된 Schottky Barrier Diode는 4H-SiC 기판을 사용하였으며 쇼트키 접촉을 위해 Ni이증착 되었다 고전압 인가 시에 egde 부분에 field가 crowding 되는 현상을 억제하기 위해 metal-oxide overlap structure 형태로 제작 하였다

본 연구에서는 제작된 다이오드를 통해 dot 크기 또는 Pad 크기 등의 구조 변화가 소자에 미치는 영향 및 후 수소 플라즈마 처리를 통한 효과 등을 관찰하였다

소자의 특성분석은 I-V, C-V, DLTS를 이용하여 분석하였으며 후 수소 플라즈마 처리로 인하여 leakage current와 ron이 감소함을 확인 할 수 있었다.