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Interface Control of Pt/GaAs Schottky Contact with Surface Sulfidation and Thermal Hydrogenation

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Two-step technique using sulfidation and subsequent thermal hydrogenation was reported to minimize defective interfacial bonds of Pt/GaAs Schottky contact, ultimately improving the electrical properties Sulfur-passivation of GaAs surface prior to Pt metallization was very effective to remove interfacial compounds such as Ga and As oxides, and resulted in the reduction of reverse leakage current and the enhancement of barrier height However, a defective interfacial bond of excess As inevitably appeared during Schottky metallization With nondestructive interface analysis using X-ray photoelectron spectroscopy, it was revealed that after hydrogenation, the Pt/GaAs interface was turned to be free of defective bond, i e , metallization-induced excess As During the thermal hydrogenation of Pt/GaAs Schottky contact, the interfacial excess As was effectively removed, and the interfacial hydrogenation at relatively low temperature could be expounded with a catalytic role of Pt metal This two-step treatment was applied to the gate line in the MESFET and the improvement of device parameter was achieved

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$CaTiO_3/MgTiO_3$ 적층형 박막의 마이크로파 유전특성

Microwave Dielectric Properties of $CaTiO_3/MgTiO_3$ Multilayered Thin Films

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이동통신기기, 저궤도 위성통신기, GPS 수신기, 군사용 레이더, 디지털 라디오의 고주파 필터로 아직까지는 유전체 필터가 많이 사용되고 있지만 기기의 소형화, 경량화, 고기능화 요구가 증가하면서 박막형 resonator와 filter 소자가 폭 넓게 이용될 것으로 예상된다

본 연구에서는, 높은 유전상수(170)와 양의 공진주파수의 온도계수(+800 ppm/°C)를 나타내는 $CaTiO_3$와 낮은 유전손실(4.5×10^{-5} at 8 GHz)과 음의 공진주파수의 온도계수(−50 ppm/°C)를 나타내는 $MgTiO_3$ 마이크로파 유전체에 대하여 졸겔법을 이용하여 박막을 제조하고, 마이크로파 유전특성의 변화를 고찰하였다 또한, $CaTiO_3$와 $MgTiO_3$ 박막을 적층형태로 제조하여, 유전특성 변화와의 상관관계를 고찰한다

고주파수 영역(100 MHz-6 GHz)에서의 유전특성을 측정하기 위해서, 각기 다른 외부 직경을 가지고 패턴되어진 상부전극을 이용하였고 HP 8510C network analyzer와 Coplanar-Wave-guide(CPW) probe를 이용하여 측정하였다