

Epitaxial Lift-Off and Film Bond Technology to develop Surface Acoustic Wave Coupled Device

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Epitaxial lift-off (ELO) technology is an effective method to fabricate surface acoustic wave sensor devices. ELO technology is a fabrication process for functional devices, which is used to lift off compound semiconductor films from their original growth substrates, and then to bond them onto other substrates. We have proposed a fabrication process based on ELO technology. We tried improving the fabrication process of SAW coupled device based ELO and film bond technology. As the results, we successfully improved the fabrication process of SAW coupled device based ELO and film bond technology. We investigated the stress in GaAs films under different treatment conditions of black wax and obtained the optimum conditions of black wax. We reduced the etching time of AlAs layer using HF solution along with surfactant and antifoaming agents. We obtained clean surfaces of the film and substrate with hydrophilicity, using $\text{NH}_4\text{OH} : \text{H}_2\text{O}_2 : \text{H}_2\text{O}$ mixed solution and O_2 plasma, and enhanced the adhesive force between GaAs film and LiNbO_3 substrate.