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Author Jian Li Chen
Author's Email Address No Public.
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Abstract
In this study, two kinds of wide band gap materials have been studied and med to fabricate the Blue to UV photodetectors. One is the II-VI quaternary compound ZnSSeTe Schottky barrier photodetectors(SBPD) and the other is the III-V compound AlGaN/GaN photodetectors. For II-VI photodetectors, a quaternary compound ZnSSeTe thin film was grown on n+ GaAs substrate by molecule beam epitaxy (MBE). The Schottky barrier was formed either by Ni/Au deposited onto the ZnSSeTe epitaxial layer by E-beam or by Sputtering-ITO. The responsivity of the fabricated ZnSSeTe photodetectors would be measured. In addition , It was found that the sheet resistances of ITO film was 39.12Ω/sq,respectively.It was also found that the transmittance of ITO film at the wavelength of 460nm was 86.5%.

Furthermore, the barrier height is about 1.02eV, and the response is 0.096 A/W at 460nm under -2 V. From the photoresponse current, we can conclude that the ZnSSeTe SBPDs were suitable applied on the Blue-UV region.

For III-V Nitride-based SBPDs, the n-AlGaN/p-GaN/n-GaN photodetectors successfully were grown by MOCVD and fabricated by ICP RIE. we can achieve a photocurrent-to-dark current ratio higher than six order of magnitude when applying a 2 V reverse bias. At this bias condition, We found that The dark current is 4.85×10-12 A, In addition , We also found that, the maximum photoresponsivity and quantum efficiency at 360nm were 0.26 A/W and 88 %, respectively.
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