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MOCVD grown hexagonal BN epilayers for DUV photonics SASHIKANTH MAJETY, JING LI, JINGYU LIN, HONGXING JIANG, Texas Tech University — Hexagonal boron nitride (hBN) has attracted a lot of interest recently owing to its excellent physical properties and its potential use as a template in graphene electronics. We report on the successful growth of hBN epilayers using metal organic chemical vapor deposition (MOCVD) on sapphire and n-AlGaN substrates. P-type conductivity control was also achieved by in-situ Mg doping. This provides us with an opportunity to solve the problem of low quantum efficiency of DUV devices using Al-rich AlGaN alloys due to their extremely low p-type conductivity. Mg doped hBN epilayers grown on insulating templates were p-type with an in-plane resistivity of 2.3 Ω cm. Diode behavior in the p-n structures of p-hBN/n-$Al_{0.62}Ga_{0.38}N$ has been demonstrated. Our results indicate that hBN epilayers have potential for DUV optoelectronic devices and also demonstrate the feasibility of using highly conductive p-type hBN as electron blocking and p-contact layers for AlGaN based deep UV emitters. This work is supported by DOE.

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