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NITRIDE MULTIPLE QUANTUM WELL CHALLENGE

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Nitride semiconductor heterostructures are widely used for light-emitting, high-power and high-frequency applications. But InGaN/GaN multiple quantum well (QW) structures are also potential candidates for scintillation detectors. This application needs completely different design of the heterostructure in comparison with LED one. It opens new problems that have not been solved yet. Main technological challenge for scintillator structure design is the demand for thick active regions with a higher number of QWs compared to that for LED structures due to the high penetration depth like high energy electrons or X-ray radiation. Another challenge is usually extremely low excitation intensity of ionizing radiation. Under such conditions, the excitonic QW luminescence can have even lower intensity than different kinds of defect bands originating either in GaN or in InGaN QWs. Our ability to realize scintillators on an InGaN/GaN base will be presented and influence of number of QWs in the structure on luminescence properties will described and discussed.

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