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Luminescence properties of Dy implanted AlN thin films

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Investigations of luminescence properties and luminescence kinetics of Dy-implanted AlN thin films grown by molecular beam epitaxy on silicon substrate in the temperature range 12-320 K are reported. The temperature studies of photoluminescence (PL) and cathodoluminescence (CL) spectra revealed weak thermal quenching. Photoluminescence excitation spectrum was measured in the spectral range 200-450 nm. The maximum CL and PL emissions are observed from Dy at 580 nm. The excitation models for RE structured isovalent hole trap in III-nitrides is discussed. The energy transfer processes between AlN host and 4*f*-shell systems are emphasized as the main mechanisms for thermal quenching processes rather than nonradiative decay of 4*f* transitions.