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We have presented the low temperature photoluminescence (PL) measurements of three 6H fluorescent Silicon Carbide (f-SiC) samples. The epilayers of the f-SiC samples were nitrogen-boron co-doped and grown by fast sublimation growth process (FSGP) method on the bulk 6H SiC substrates. The doping concentrations of the f-SiC epilayers were determined by secondary ion mass spectroscopy (SIMS) showing strong n-type, strong p-type and slight p-type extrinsic semiconductor doping of each epilayer. The PL intensity of one commercial 6H bulk SiC (TanKeBlue Ltd.) was also measured and applied as the reference. The PL was excited by a diode laser source with wavelength of 405 nm and power of 5 mW. The temperature of the PL measurement was ranged from 25K to 300K when the liquid nitrogen cryostat was used, while lower temperature from 5K was achieved when the cryostat with liquid helium was applied. The anomalous temperature dependences of the PL intensity spectrum of f-SiC samples were found. The PL peak energy's S-shape dependence on the temperature was observed which was caused by nitrogen induced localization effect. For strong p-type f-SiC, one more PL intensity peak at 5 k was observed at wavelength of 520 nm, where this extra PL peak was the result of basal plane dislocation and free-to-acceptor recombination.

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