



## Low Temperature Photoluminescence of 6H fluorescent SiC

Wei, Yi; Künecke, Ulrike; Jokubavicius, Valdas; Syväjärvi, Mikael; Wellmann, Peter; Ou, Haiyan

*Publication date:*  
2017

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Wei, Y., Künecke, U., Jokubavicius, V., Syväjärvi, M., Wellmann, P., & Ou, H. (2017). *Low Temperature Photoluminescence of 6H fluorescent SiC*. Abstract from E-MRS Spring Meeting 2017, Stasbourg, France.

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## Low Temperature Photoluminescence of 6H fluorescent SiC

Yi Wei<sup>1</sup>, Ulrike Künecke<sup>2</sup>, Valdas Jokubavicius<sup>3</sup>, Mikael Syväjärvi<sup>3</sup>, Peter Wellmann<sup>2</sup>, Haiyan Ou<sup>1</sup>

<sup>1</sup> Department of Photonics Engineering, Technical University of Denmark, DK-2800,

Kgs. Lyngby, Denmark

<sup>2</sup> Crystal Growth Lab, Materials Department 6 (i-meet), University of Erlangen-Nuremberg, Martensstr. 7, D-91058 Erlangen, Germany

<sup>3</sup> Department of Physics, Chemistry and Biology, Linköping University, 58 183 Linköping, Sweden

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.

This study was supported by Innovation Fund Denmark (No. 4106-00018B).