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*Publication date:*  
2015

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

[Link back to DTU Orbit](#)

*Citation (APA):*

Ou, H., Ou, Y., Lu, W., Fadil, A., Argyraki, A., Kaiser, M., ... Syväjärvi, M. (2015). *A new type of white light-emitting diode light source basing on fluorescent SiC*. Abstract from SSLCHINA 2015, Shenzhen, China.

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## **A new type of white light-emitting diode light source basing on fluorescent SiC**

Haiyan Ou<sup>1,\*</sup>, Yiyu Ou<sup>1,2</sup>, Weifang Lu<sup>1</sup>, Ahmed Fadil<sup>1</sup>, Aikaterini Argyraki<sup>1</sup>, Michl Kaiser<sup>3</sup>, Peter Wellmann<sup>3</sup>, Valdas Jokubavicius<sup>4</sup>, Mikael Syväjärvi<sup>4</sup>

Department of Photonics Engineering, Technical University of Denmark, DK-2800, Lyngby, Denmark

2 Presently with Light extraction ApS, DK-2800, Denmark

3Materials of Electronics Energy Technology, University of Erlangen-Nuremberg, D-91058, Erlangen, Germany

4 Department of Physics, Chemistry and Biology, Linköping University, SE-58183, Linköping, Sweden

\*haou@fotonik.dtu.dk

### **Abstract**

Most of the commercial white light-emitting diode (LED) light sources are made from phosphor coated blue-emitting gallium nitride (GaN) chips. This type white LED light source always has tradeoff between luminous efficacy and color rendering index (CRI). Furthermore, yellow-emitting phosphor decays much faster than the semiconductor chip, so the white color will turn into bluish over the time. This paper will propose a new type white LED light source: using fluorescent silicon carbide (SiC) to take the place of phosphor. This new type LED has the following advantages: a) SiC is a wide bandgap semiconductor material, so it is stable; b) Fluorescent SiC has very wide emission spectrum, and it could generate white light with very high CRI; c) It is a better substrate than sapphire for the GaN growth in terms of lattice match and thermal conductivity. This paper will cover: the growth of fluorescent SiC, its optical characterization, nanostructuring of the SiC surface for extraction efficiency enhancement, and surface passivation for further efficiency enhancement.