

# Multifunctional Sm<sup>3+</sup> induced bismuth lithium tungstate phosphor for flexible anti-counterfeiting and encryption

**Indrajeet Maurya<sup>1</sup>, Mukesh K. Sahu<sup>1,2</sup>, Vikas<sup>1</sup>, A. K. Vishwakarma<sup>3</sup>, M. Jayasimhadri<sup>1\*</sup>**

<sup>1</sup> Luminescent Materials Research Lab (LMRL), Department of Applied Physics, Delhi Technological University, Delhi-110 042, India

<sup>2</sup> School of Computing, Graphic Era Hill University (GEHU), Haldwani, Uttarakhand, 263 136, India

<sup>3</sup> Department of Physics, ARSD College, University of Delhi, 110021, India

\*Corresponding Author e-mail- [jayaphysics@yahoo.com](mailto:jayaphysics@yahoo.com)

**Abstract:** In recent times, one of the challenging issues is the counterfeiting of goods which has major implications for governments, corporations, and consumers everywhere in the world [1, 2]. Since counterfeiting is an increasingly high-tech crime, there must be high-tech solutions to stop and discourage the practice. With this motive, the current research emphasized on strategic flexible anticounter fitting. The crystalline monoclinic phase of Sm<sup>3+</sup> induced bismuth lithium tungstate (BLW) phosphor has been synthesized via solid state reaction technique to examine the direct utility in anti-counterfeiting and encryption. Diffraction patterns and micrographs have confirmed the monoclinic crystalline and non-uniform micron size particles, respectively. Defuse reflectance spectra revealed the numerous absorption peaks in UV and visible range. The photoluminescence (PL) emission peak observed at 603 nm via pumping through UV/n-UV and blue light is corresponding to the <sup>4</sup>G<sub>5/2</sub>→<sup>6</sup>H<sub>7/2</sub> transition. CIE coordinates of BLW: Sm<sup>3+</sup> phosphors are located in the orange-red region of the chromaticity diagram. Above mentioned results of BLW phosphor suggest the prolific properties of the as-synthesized phosphor for the luminescent security inks and their anti-counterfeiting applications.

## References

- [1] Pawan Kumar, Satbir Singh, B. K. Gupta, *Nanoscale*, 8 (2016) 14297-14340. DOI: <https://doi.org/10.1039/C5NR06965C>.
- [2] Jia Wang, Jun Ma, Jiachi Zhang, Yu Fan, Wenxiang Wang, Jika Sang, Zhidong Ma, Huihui Li, *ACS Appl. Mater. Interfaces* 11 (2019) 35871-35878. DOI: <https://doi.org/10.1021/acsami.9b10870>.