

---

# Nonmetallic nanomaterials for electrochemiluminescence applications

Guobao Xu<sup>\*†</sup>

<sup>1</sup>State Key Laboratory of Electroanalytical Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences – China

## Abstract

Electrochemiluminescence (ECL) is chemiluminescence resulting from electrochemical reactions. In comparison with conventional chemiluminescence, ECL exhibits several advantages such as facile spatial and temporal control, good reproducibility, stable reagent, electrochemical tunability and capability of electrochemical signal amplification. As a result, ECL has been extensively studied and has broad analytical applications. Nanomaterials play versatile roles in ECL as luminophores, catalyst, quenchers, immobilization matrixes, and so on [1-3].

Herein, the syntheses and analytical applications of some nonmetallic nanomaterials is presented, such as ultrasensitive glutathione detection using MnO<sub>2</sub> nanosheets, ozone detection by Ru(phen)<sub>3</sub><sup>2+</sup>-doped silica nanoparticles, ATP aptasensor based on single-walled carbon nanohorn quencher, immobilization of ruthenium complexes with graphene materials, oxide nanofilm-covered stainless steel electrode for enhancing sensitivity [4-10].

## Acknowledgements

This project was supported by the National Natural Science Foundation of China (No. 21505128 and 21675148) and the National Key Research and Development Program of China (No. 2016YFA0201300)

## References

- (1) Kateryna Muzyka, Muhammad Saqib, Zhongyuan Liu, Wei Zhang, Guobao Xu, *Biosens. Bioelectron.*, 2017, 92, 241.
- (2) Wenyue Gao, Muhammad Saqib, Liming Qi, Wei Zhang, and Guobao Xu. *Current Opinion in Electrochemistry*. 2017, 3, 4.
- (3) Zhongyuan Liu, Wenjing Qi, Guobao Xu, *Chem. Soc. Rev.*, 2015, 45, 715.
- (4) Wenyue Gao, Zhongyuan Liu, Liming Qi, Jianping Lai, Shimeles Addisu Kitte, and Guobao Xu. *Anal. Chem.*, 2016, 88, 7654.

---

\*Speaker

†Corresponding author: guobaoxu@ciac.ac.cn

- (5) Wenjing Qi, Di Wu, Jianming Zhao, Zhongyuan Liu, Wei Zhang, Ling Zhang, Guobao Xu, *Anal. Chem.*, **2013**, *85*, 3207.
- (6) Zhongyuan Liu, Wei Zhang, Wenjing Qi, Wenyue Gao, Saima Hanif, Muhammad Saqib, and Guobao Xu. *Chem. Commun.*, 2015, **51**, 4256.
- (7) Yali Yuan, Haijuan Li, Shuang Han, Lianzhe Hu, Saima Parveen, Haoran Cai, and Guobao Xu. *Anal. Chim. Acta*, 2012, *720*, 38.
- (8) Haijuan Li, Jiuan Chen, Shuang Han, Wenxin Niu, Xiaoqing Liu, and Guobao Xu, *Talanta*, 2009, *79*, 165.
- (9) Lihong Shi, Xiaoqing Liu, Haijuan Li, and Guobao Xu, *Anal. Chem.*, 2006, *78*, 7330.
- (10) Shimeles Addisu Kitte, Wenyue Gao, Yuriy T. Zholudov, Liming Qi, Anaclet Nsabi-  
mana, Zhongyuan Liu, and Guobao Xu. *Anal. Chem.*, 2017, *89*, 9864.

**Keywords:** electrochemiluminescence, graphene oxide, graphene, ruthenium complex, immobilization