**Preparation of Carbon Nitride Composite and Its Application in Electrochemical Detection.**

Chenglong Chen, Wu Lei\*

*School of Chemical Engineering, Nanjing University of Science and Technology, Nanjing 210094, Jiangsu, China.*

*\*Corresponding author: leiwuhao@njust.edu.cn*

**Highlights**

* Carbon nitride quantum dots is used to prepare electrochemical sensors for the determination of ascorbic acid.
* Optimized various factors affecting the electrochemical performance of the electrode to achieve the best detection results
* The proposed ascorbic acid sensor has outstanding sensitivity, wide linear range and low detection limit.

**1. Introduction**

Ascorbic Acid (AA) is an important antioxidant widely present in biological systems, which is an essential substance to maintain normal physiological function of human body. Abnormal contents of AA may cause several symptoms, including fatigue, infertility and scurvy. Therefore, it is imperative to develop a fast and sensitive analysis approach for AA quantitative determination.[1-6]

**2. Methods**

Carbon nitride quantum dots (CNQDs) were prepared by hydrothermal method using sodium citrate and urea as raw materials, and characterized by transmission electron microscopy (TEM) and fluorescence spectroscopy. Then, the electrochemical sensor (CNQDs/PEDOT/GCE) for the determination of ascorbic acid was prepared by in situ polymerization. The cyclic voltammetry was used to study the effect of ascorbic acid on the electrode electrochemical behavior.

**3. Results and discussion**

The optimum material ratio and the best experimental environment were obtained by the optimization experiment. The CVs of AA acquired at CNQDs/PEDOT/GCE were shown in **Fig. 1**. Under the optimal experimental conditions, the anodic peak current exhibited a linear response to the increasing concentration of AA in the range of 50-1500 μM and the linear equation can be elucidated as: Ipa, AA(μA) = 0.0185 CAA (μM) - 0.1019 (R2 = 0.9999). The limit of detect (LOD) were calculated as low as 6.38 μM for AA (S/N = 3).



**Figure 1.** A) CVs at CNQDs/PEDOT/GCE in 0.2 M PBS (pH =7.4) containing different concentrations of AA from 50 μM to 1500 μM. D) The linear relationship between anodic peak current and the concentration of AA.

**4. Conclusions**

The results show that the modified electrode has many advantages, such as outstanding sensitivity, wide linear range, low detection limit and so on. Based on the excellent properties of carbon nitride quantum dots, a new type of electrochemical sensor was established to determine the concentration of ascorbic acid in human body.

**References**

[1] H. Ding, P. Zhang, T.Y. Wang, J.L. Kong, H.M. Xiong, NANOTECHNOLOGY, 25 (2014) 205604.

[2] M. Sadhukhan, S. Barman, J. Mater. Chem. A, 1 (2013) 2752-2756.

[3] A. Vinu, Adv. Funct. Mater., 18 (2010) NA-NA.

[4] J. Wen, J. Xie, X. Chen, X. Li, Appl. Surf. Sci., 391 (2017) 72-123.

[5] G. Xin, Y. Meng, J. Chem.,2013,(2012-11-4), 2013 (2012).

[6] G. Xin, Y. Xia, Y. Lv, L. Liu, B. Yu, Water Environ. Res., 88 (2016) 318.