***In situ* Growth of Gold Nanoparticles Based on Simultaneous Green Reduction by Methylene Blue for Non-Enzymatic Glucose Sensing**

Wenyuan Zhu¹, Xiaoya Li¹, Weihong Liu¹, Zuodong Chen¹, Jianping Li¹ and Hongcheng Pan^{1,2,3,*}

¹ College of Chemistry and Bioengineering, Guilin University of Technology, 12 Jiangan Road, Guilin 541004, P. R. China.

² Guangxi Colleges and Universities Key Laboratory of Food Safety and Detection, Guilin University of Technology, 12 Jiangan Road, Guilin 541004, P. R. China.

³ Guangxi Key Laboratory of Electrochemistry and Magnetiochemistry Functional Materials, Guilin University of Technology, 12 Jiangan Road, Guilin 541004, P. R. China.

*E-mail: hcp@163.com

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We presents a novel approach for *in situ* growth of highly-dispersed gold nanoparticles (AuNPs) on the electropolymerized methylene blue (PMB)/ITO electrode (Au/PMB/ITO) without using additional binding molecules and toxic reductants. Methylene blue (MB) monomers remaining in the PMB films on ITO served as both the reductant to form AuNPs by reducing AuCl_4^- , and as anchoring sites for *in situ* growth of AuNPs via the electrostatic interaction between AuCl_4^- and positively charged MB that avoids the aggregation of AuNPs, thereby improving their dispersity. Cyclic voltammetry (CV), differential pulse voltammetry (DPV), scanning electron microscope (SEM), UV–Vis spectroscopy (UV–Vis) and Fourier transformation infrared spectroscopy (FTIR) were used to characterize the resulting polymer and nanoparticles. The as-prepared Au/PMB/ITO exhibited an excellent electrocatalytic activity towards glucose oxidation with a high sensitivity of $312 \mu\text{A mM}^{-1} \text{cm}^{-2}$ at a low operating potential of 0.04 V.

Keywords: Gold Nanoparticles; In Situ Growth; Methylene blue; non-enzymatic glucose sensing

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