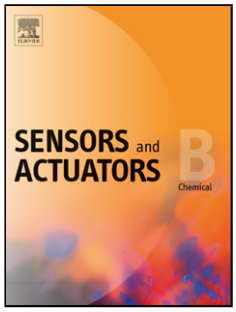

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Authors: Xiaohua Li, Bingru Liu, Xu Hun

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Bimetallic Nanomaterials as Nanocatalysts and the Carrier Coupling Chemiluminescence Aptamer Strategy for Cancer Cell Detection

Xiaohua Li [a], Bingru Liu [b], Xu Hun [b,1]

[a] School of Chemistry and Environmental Engineering, Shanxi Datong University, Shanxi, 037009 China

[b] Key Laboratory of Sensor Analysis of Tumor Marker, Ministry of Education; State Key Laboratory Base of Eco-chemical Engineering; Key Laboratory of Rubber-Plastics of Ministry of Education/Shandong Provincial Key Laboratory of Rubber Plastics; Key Laboratory of Biochemical Analysis, Shandong Province; College of Chemistry and Molecular Engineering, Qingdao University of Science and Technology, Qingdao 266042, China

[1]Corresponding author, E-mail: 634576049@qq.com;

Highlights

- Cu/Co BNMs had superior over Cu and Co monometallic nanomaterials.
- Cu/Co BNMs were used as nanocatalysts and the carrier for CL detection.
- Detection limit of 270 cells/mL was gained.

Abstract

Cu/Co bimetallic nanomaterials (BNMs) were synthesized firstly. The chemiluminescence (CL) catalytic properties of BNMs were investigated systemically. Experimental results revealed that combined Cu with Co could cause a 67.9 ± 3.5% increase in the CL intensity because of a great synergic catalytic effect. Based on this interesting phenomenon, a steric hindrance strategy for cancer cell detection was fabricated. BNMs were used as nanocatalysts and the carrier modified with capture DNA. In presence of CCRF-CEM cell, sgc8 aptamer and probe DNA recognized with CCRF-CEM. And the bio bar code CCRF-CEM cells were formed. After bio bar code CCRF-CEM cells hybridized with capture DNA which modified Cu/Co BNMs, CL probe was introduced. The CL intensity is linearly related to the concentration of cell from 500 to 100000 cells/mL. The detection limit is 270 cells/mL and the relative standard deviation is 3.9% at a level of 1000 cells/mL (n = 9). This method was successfully applied to the determination of cell in spiked real