Electrochemiluminescence of CdTe Quantum Dots and Sensitive Detection of Hemoglobin

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CdTe quantum dots were modified to the surface of glassy carbon electrode (GCE) using Nafion, and the electrochemiluminescence (ECL) behavior of CdTe quantum dots immobilized in Nafion was investigated. Compared with ECL of CdTe quantum dots on the bare GCE, the ECL intensity of CdTe quantum dots modified into the Nafion film was obviously enhanced. Moreover, the ECL behavior of CdTe quantum dots in Nafion films had significant size dependence. CdTe quantum dots–Nafion could generate strong ECL signals in the presence of tripropylamine as the co-reactant in the phosphate buffer solution (PBS) at pH 7.0. A new method for the detection of hemoglobin was established based on hemoglobin could efficiently quench the ECL intensity of CdTe quantum dots. The results showed that the detection signal $\lg [(I_0-I)/I]$ and the logarithm of hemoglobin concentration $\lg C$ had a good linear relationship between 1.0×10^{-9} mol/L and 5.0×10^{-6} mol/L. The detection limit was 2.6×10^{-10} mol/L.

Keywords: CdTe quantum dots; ECL quenching; tripropylamine; hemoglobin

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