

Accepted Manuscript

Enhanced Sensitivity to Detection Nanomolar Level of Cu²⁺ Compared to Spectrophotometry Method by Functionalized Gold Nanoparticles: Design of Sensor Assisted by Exploiting First-order Data with Chemometrics



Zolaikha Rasouli, Raouf Ghavami

PII: S1386-1425(17)30828-4
DOI: doi:[10.1016/j.saa.2017.10.027](https://doi.org/10.1016/j.saa.2017.10.027)
Reference: SAA 15533

To appear in: *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*

Received date: 10 June 2017
Revised date: 24 September 2017
Accepted date: 9 October 2017

Please cite this article as: Zolaikha Rasouli, Raouf Ghavami , Enhanced Sensitivity to Detection Nanomolar Level of Cu²⁺ Compared to Spectrophotometry Method by Functionalized Gold Nanoparticles: Design of Sensor Assisted by Exploiting First-order Data with Chemometrics. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Saa(2017), doi:[10.1016/j.saa.2017.10.027](https://doi.org/10.1016/j.saa.2017.10.027)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Enhanced sensitivity to detection nanomolar level of Cu²⁺ compared to spectrophotometry method by functionalized gold nanoparticles: design of sensor assisted by exploiting first-order data with chemometrics

Zolaikha Rasouli, Raouf Ghavami*

Department of Chemistry, Faculty of Science, University of Kurdistan, P. O. Box 416, Sanandaj, Iran

Abstract

A simple, sensitive and efficient colorimetric assay platform for the determination of Cu²⁺ was proposed with the aim of developing sensitive detection based on the aggregation of AuNPs in presence of a histamine H₂-receptor antagonist (famotidine, FAM) as recognition site. This study is the first to demonstrate that the molar extinction coefficients of the complexes formed by FAM and Cu²⁺ are very low (by analyzing the chemometrics methods on the first order data arising from different metal to ligand ratio method), leading to the undesirable sensitivity of FAM-based assays. To resolve the problem of low sensitivity, the colorimetry method based on the Cu²⁺-induced aggregation of AuNPs functionalized with FAM was introduced. This procedure is accompanied by a color change from bright red to blue which can be observed with the naked eyes. Detection sensitivity obtained by the developed method increased about 100 fold compared with the spectrophotometry method. This sensor exhibited a good linear relation between the absorbance ratios at 670 to 520 nm ($A_{670/520}$) and the concentration in the range 2-110 nM with LOD = 0.76 nM. The satisfactory analytical performance of the proposed sensor facilitates the development of simple and affordable UV-Vis chemosensors for environmental applications.

Download English Version:

<https://daneshyari.com/en/article/5139312>

Download Persian Version:

<https://daneshyari.com/article/5139312>

[Daneshyari.com](https://daneshyari.com)