

## Accepted Manuscript

Rational Design of a Stable Peroxidase Mimic for Colorimetric Detection of  $\text{H}_2\text{O}_2$  and Glucose: A Synergistic  $\text{CeO}_2$ /Zeolite Y Nanocomposite

Xiaowei Cheng, Le Huang, Xuanyu Yang, Ahmed A. Elzatahry, Abdulaziz Alghamdi, Yonghui Deng

PII: S0021-9797(18)31185-8  
DOI: <https://doi.org/10.1016/j.jcis.2018.09.101>  
Reference: YJCIS 24152

To appear in: *Journal of Colloid and Interface Science*

Received Date: 26 August 2018  
Revised Date: 28 September 2018  
Accepted Date: 28 September 2018

Please cite this article as: X. Cheng, L. Huang, X. Yang, A.A. Elzatahry, A. Alghamdi, Y. Deng, Rational Design of a Stable Peroxidase Mimic for Colorimetric Detection of  $\text{H}_2\text{O}_2$  and Glucose: A Synergistic  $\text{CeO}_2$ /Zeolite Y Nanocomposite, *Journal of Colloid and Interface Science* (2018), doi: <https://doi.org/10.1016/j.jcis.2018.09.101>

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.



# Rational Design of a Stable Peroxidase Mimic for Colorimetric Detection of H<sub>2</sub>O<sub>2</sub> and Glucose: A Synergistic CeO<sub>2</sub>/Zeolite Y Nanocomposite

Xiaowei Cheng,<sup>1,\*</sup> Le Huang,<sup>2</sup> Xuanyu Yang,<sup>1</sup>

Ahmed A. Elzatahry,<sup>3,\*</sup> Abdulaziz Alghamdi,<sup>4</sup> and Yonghui Deng<sup>1</sup>

<sup>1</sup> Department of Chemistry, State Key Laboratory of Molecular Engineering of Polymers, Shanghai Key Laboratory of Molecular Catalysis and Innovative Materials, iChEM (Collaborative Innovation Center of Chemistry for Energy Materials), Fudan University, Shanghai 200433, China.

<sup>2</sup> School of Environmental and Chemical Engineering, Shanghai University, Shanghai 200444, China.

<sup>3</sup> Materials Science and Technology Program, College of Arts and Sciences, Qatar University, P.O. Box 2713, Doha, Qatar.

<sup>4</sup> Department of Chemistry, College of Science, King Saud University, Riyadh 11451, Saudi Arabia.

\*Corresponding Author: xwcheng@fudan.edu.cn (X. W. Cheng), aelzatahry@qu.edu.qa (A. A. Elzatahry).

**Abstract** Owing to the high costs and instability of natural enzymes, the development of enzyme mimics based on inorganic nanomaterials has attracted a wide concern in recent years. In this work, a stable nanocomposite composed of highly dispersed CeO<sub>2</sub> nanoparticles decorated on zeolite Y as support (CeO<sub>2</sub>/Y) was synthesized by a facile wet impregnation method, and the CeO<sub>2</sub>/Y nanocomposite was firstly proposed as an efficient peroxidase-mimicking nanozyme for accurate detection of H<sub>2</sub>O<sub>2</sub> and glucose. The best catalyst was the nanocomposite with CeO<sub>2</sub> to zeolite Y mass ratio of 0.20 (denoted as 20CeO<sub>2</sub>/Y), showing a better affinity and higher catalytic constant to the substrate of H<sub>2</sub>O<sub>2</sub> and 3,3',5,5'-tetramethylbenzidine (TMB) than horseradish peroxidase (HRP) enzymes by the steady-state kinetic analysis. The enzyme-mimicking catalyst could be used over a wider range of pH and temperature

Download English Version:

<https://daneshyari.com/en/article/11020898>

Download Persian Version:

<https://daneshyari.com/article/11020898>

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