

# Author's Accepted Manuscript

Nanoparticle Stripe Based Sensor for Highly Sensitive and Selective Detection of Mercury Ions

Pengcheng Zhang, Zhaozi Lyu, Jekaterina Viktorova, Andreas Offenhäusser, Lingyan Feng, Dirk Mayer



PII: S0956-5663(18)30461-5  
DOI: <https://doi.org/10.1016/j.bios.2018.06.029>  
Reference: BIOS10549

To appear in: *Biosensors and Bioelectronic*

Received date: 11 April 2018  
Revised date: 8 June 2018  
Accepted date: 18 June 2018

Cite this article as: Pengcheng Zhang, Zhaozi Lyu, Jekaterina Viktorova, Andreas Offenhäusser, Lingyan Feng and Dirk Mayer, Nanoparticle Stripe Based Sensor for Highly Sensitive and Selective Detection of Mercury Ions, *Biosensors and Bioelectronic*, <https://doi.org/10.1016/j.bios.2018.06.029>

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 galley proof before it is published in its final citable 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.

# Nanoparticle Stripe Based Sensor for Highly Sensitive and Selective Detection of Mercury Ions

*Pengcheng Zhang<sup>1</sup>, Zhaozi Lyu<sup>1</sup>, Jekaterina Viktorova<sup>1</sup>, Andreas Offenhäusser<sup>1</sup>,  
Lingyan Feng<sup>1,2</sup>, Dirk Mayer<sup>1,\*</sup>*

1 Institute of Complex Systems, Bioelectronics (ICS-8) and JARA – Fundamentals of Future Information Technology, Forschungszentrum Jülich, 52425 Jülich, Germany

2 Materials Genome Institute, Shanghai University, Shanghai, China

\*dirk.mayer@fz-juelich.de

## ABSTRACT

Mercury and its compounds are emitted during industrial processes and are extremely harmful for eco systems and human health. Therefore, the detection of mercury ions ( $\text{Hg}^{2+}$ ) in our living and working environment is of great importance for the society and especially for the health of human beings. Here we demonstrate a proof of concept nanoparticle stripe based sensor for highly sensitive and selective detection of  $\text{Hg}^{2+}$ . This sensor is based on the changes of the charge transport between the neighboring nanoparticles in the nanoparticle stripe. The addition of  $\text{Hg}^{2+}$  induces the chelation between  $\text{Hg}^{2+}$  and carboxylic groups on the surface modification molecules and thus facilitates the charge transport, causing an increase of conductivity in the nanoparticle stripe. These nanoparticle stripes with a few layers in height and several micrometers in width possess large surface area, which increases their exposure to ions and provides greater ability to detect  $\text{Hg}^{2+}$  at low concentrations. Besides, we studied the effect of molecular length on the sensitivity of the sensor. It is shown that the length of surface modification molecules is

Download English Version:

<https://daneshyari.com/en/article/7229066>

Download Persian Version:

<https://daneshyari.com/article/7229066>

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