

An original nanostructuring of a gold substrate for electrochemical sensors of nitrates

Emilie Lebon Tailhades^{1,5}, Pierre Fau^{1,4}, Myrtil Kahn¹, Maurice Comtat², Pierre Temple-Boyer³, Philippe Behra⁶, Brigitte Dubreuil⁶, Katia Fajerweg^{1,4}

¹Laboratoire de Chimie de Coordination (LCC), Toulouse, France (CNRS)

²Laboratoire de Génie Chimique, Toulouse, France (CNRS/INP/UPS)

³LAAS-CNRS, Université de Toulouse, CNRS, Toulouse, France

⁴Université Toulouse III - Paul Sabatier, Toulouse, France

⁵RTRA “Sciences et Technologies pour l’Aéronautique et l’Espace”, Toulouse, France

⁶Laboratoire de Chimie Agro Industrielle, Toulouse (INRA/INP-ENSIACET), France

Mail: katia.fajerweg@lcc-toulouse.fr

Determination and quantification of nitrates are considered to be essential. Indeed, they are a well-known contaminant of ground and stream water. Nitrate is an important environmental and human health analyte^(1,2). In the specific area of oceanography, there is a growing demand for the ocean observations and for a better understanding of biogeochemical cycles and mixing of water masses. So, the development of simple, low-power, sensitive, selective and stable analytical *in-situ* sensors appears as a necessity.

The aim of this study is to develop an electrochemical sensor in order to measure nitrates at very low concentrations (nanomolar) in seawater (pH ca 6). We present here an original way for the functionalization of a gold electrode (E_{Au}) using an organometallic silver precursor in order to obtain well dispersed silver nanoparticles (AgNP) with small sizes and narrow distribution.

The advantage of this resulting nanostructured surface combines the electrochemical properties of the gold electrode and the presence of silver nanoparticles AgNPs⁽³⁾ (Figure 1). This was shown in previous works dedicated to electrodeposited Ag nanoparticles (AgNPs) in aqueous medium using a silver salt ($AgNO_3$). The results obtained for different synthetic NO_3^- solutions using the proposed AgNP-modified-gold electrode will be discussed.

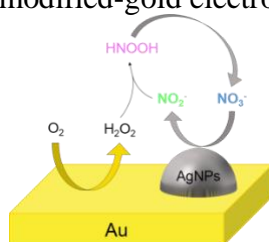


Fig.1. Mechanism of electroreduction of NO_3^- ions on a AgNP-modified gold electrode.

References

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