

# DEVELOPMENT OF NEW NICKEL ALLOY COATINGS BY ELECTROPLATING FOR UREA OXIDATION REACTION

G.Guilbert<sup>1\*</sup>, F. Maseri<sup>1</sup>, M.-G. Olivier<sup>1,2</sup>.

1. Materia Nova ASBL, Rue de l'Epargne 56 B-7000 Mons, Belgium
2. Materials Science Department, University of Mons, Rue de l'Epargne 56 B-7000 Mons, Belgium

\* Corresponding author. E-mail: Gregory.GUILBERT@MATERIANOVA.BE

*Keywords: urea, electrocatalyst, nickel, electroplating*

New nickel alloy coatings deposited by cathodic electrodeposition are evaluated as electrocatalyst for the Urea Oxidation Reaction (UOR), with potential applications in environmental remediation, such as wastewater treatment, and in energy conversion technologies including cost-effective and efficient hydrogen production.

The chemical composition of a catalyst and the number of accessible active sites for the reaction play a crucial role in its kinetic performance. So, electrodeposition is a cheap, versatile and straightforward technique to produce coatings with controlled chemical composition, surface morphology and structure.

This study focuses on the electrodeposition of Ni alloy coatings of various compositions and microstructures by adjusting the bath composition and deposition parameters.

Scanning Electron Microscopy (SEM) is used for determining the morphology and the structural properties of the deposits. The chemical composition analysis of the coatings is performed by Energy Dispersive X Ray Analysis (EDX), while the crystalline phases are investigated using X-Ray Diffraction (XRD).

Finally, the electrocatalytic properties of the coatings are evaluated by electrochemical techniques, such as cyclic voltammetry (CV) and chronoamperometry. These methods allow the assessment of the coating's activity, overvoltage, stability and efficiency under different electrochemical conditions.

36th Surface Modification Technologies  
25th to 28th February  
Barcelona, Spain

