Electrochemical surface treatment

Composante
ENSMAC

Présentation

Code interne : PI8ECSTR

Description

The main goal of this lecture is to familiarize the students with the basic notions of the different electrochemical approaches that can be used to modify the physico-chemical properties of surfaces. The modification ranges from electrografted monomolecular layers to the electrodeposition of metal and semiconductor layers. Industrial applications in various fields will be treated for every specific case.
Among others the following competences will be acquired by the students:
Electrochemical cleaning of surfaces
Electrografting of organized molecular layers on surfaces
Fundamentals and applications of electrodeposition of metals
Electrodeposition of metaloxides
Electrogeneration of insulating and conducting polymer layers

Pré-requis obligatoires

Good background in redox chemistry basic knowledge in electrochemistry working knowledge in physical chemistry

Syllabus

Short recall of the basics of electrochemistry
Cathodic processes
In situ generation of detergents for cleaning
Reduction of diazonium salts
Metal electrodeposition
Cataphoresis
Anodic processes
In situ generation of detergents for cleaning
Electrochemical sol-gel process

Electropolymerisation
Anodization of metals
Electroless deposition
Electrochemical patterning of surfaces

Informations complémentaires

Chimie Physique et Analytique

Bibliographie

For the fundamentals and theoretical aspects
Electrochimie : thermodynamique - cinétique NATHAN éditeur , 1996
Electrochimie physique et analytique H.H.Girault Presses Polytechniques et Universitaires Romandes, Lausanne, 2001
For practical general aspects
Electrochemistry for chemists D.T.Sawyer, A.Sobkowiak, J.L.Roberts, Wiley, 1995
For specific aspects of surface treatment
Electrodeposition: The Materials Science of Coatings and Substrates, J.W. Dini, Noyes Publication, 1993
Fundamentals of Electrochemical Deposition, M.Paunovic, M.Schlesinger, The Electrochemical Society 2006

Modalités de contrôle des connaissances

Évaluation initiale / Session principale - Épreuves

Type d'évaluation	Nature de l'épreuve	Durée (en minutes)	Nombre d'épreuves	Coefficient de l'épreuve	Note éliminatoire de l'épreuve	Remarques
Epreuve Terminale	Ecrit	60		100		

Seconde chance / Session de rattrapage - Épreuves

Type d'évaluation	Nature de l'épreuve	Durée (en minutes)	Nombre d'épreuves	Coefficient de l'épreuve	Note éliminatoire de l'épreuve	Remarques
Epreuve terminale	Ecrit	60		100		

Infos pratiques

Contacts

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