

Electrochemical surface treatment



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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