MAPR2370 Corrosion & protection of metals

[22.5h] 2 credits

This course is taught in the 2nd semester

Teacher(s): Christian Leroy
Language: French
Level: Second cycle

Aims

The course aims at analysing the corrosion mechanisms of metals and at deducing the techniques for their protection against corrosion. Elements of tests and measurements of corrosion complete the course.

Main themes

- Principal observations of mechanisms of corrosion, types of corrosion, standard of most frequent corrosion environments.
- Concepts of electrochemistry to understand mechanisms of corrosion of metals.
- Electrochemical equilibrium diagrams (Pourbaix diagrams) of usual metals (iron, aluminium, copper, zinc, lead, tin and their alloys such as stainless steels).
- Significant types of electrochemical corrosion, corrosion at higher temperature and bacterial corrosion.
- Techniques of protection against corrosion: cathodic protection, contribution of inhibitors, formation of passivating layers or application of protective coatings (metal, vitreous or organic).
- Tests and measurements of corrosion: tests of accelerated corrosion, simulations in laboratory and natural or industrial site.
- Basic bibliography.

Content and teaching methods

- General Mechanisms of corrosion, corroding environments, types of corrosion. - Concepts of electrochemistry in relation to the corrosion of metals. - Electrochemical equilibrium diagrams. - Analysis of various types of electrochemical corrosion. - Corrosion at higher temperature. - Bacterial corrosion. - Techniques of protection against corrosion. - Tests and measurements of corrosion.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Nil

Other credits in programs

INCH21	Première année du programme conduisant au grade d'ingénieur civil chimiste	(2 credits)	
INCH22	Deuxième année du programme conduisant au grade d'ingénieur civil chimiste	(2 credits)	Mandatory
INCH23	Troisième année du programme conduisant au grade d'ingénieur civil chimiste	(2 credits)	
MATR22	Deuxième année du programme conduisant au grade d'ingénieur civil en science des matériaux	(2 credits)	
MECA22	Deuxième année du programme conduisant au grade d'ingénieur civil mécanicien	(2 credits)	