



SUBJECT DATASHEET

Semester:	2009/10/2
Subject:	Corrosion Basics
Code:	VEMKKO2112A
Responsible department:	Department of Physical Chemistry
Responsible department code:	MKFK
Responsible lecturer:	dr. Tamás Kristóf

Educational objectives:

Basic knowledge of thermodynamics and kinetics of corrosion and of corrosion protection.

Detailed content of the subject:

General overview of corrosion. History. The influence of various factors on the initiation and advancement of corrosion. Economic impact of corrosion. Classification and characterisation of corrosion processes. The role of media, kinetic and mechanism. Metal and solution characteristics important to corrosion. Forms of corrosion. Recognition and prevention. Opportunities in corrosion control. Chemical corrosion. Atmospheric corrosion. High-temperature corrosion, including air and flue gases. Electrochemical corrosion. Definitions. Cathodic and anodic processes. Galvanic corrosion. Galvanic series. Factors influencing galvanic corrosion behaviour. Intergranular attack. Dealloying. Oxygen concentration cell. Mechanical aspects. Stress corrosion. Erosion corrosion, cavitation. Hydrogen embrittlement. Thermodynamics of corrosion. Heterogeneous equilibria in electrochemical systems. Potential - pH diagrams. The potential - pH diagrams of iron, copper and aluminum. Biologically influenced corrosion. Corrosion of plastics and concrete. Design of active and passive corrosion control. Corrosion problems of municipal water and cooling water systems. Corrosion of boilers and heating systems. Corrosion by water and steam. Underground/soil corrosion. Inorganic coatings. Organic coatings. Paint-coats. Inhibitors: theoretical background and mechanism of inhibition. Kinetic effects. Wagner-Traud mechanism. Corrosion of metals in active and passive state.

Requirements:

None.

Required and suggested references:

1. Erdey-Grúz T.: Elméleti fizikai kémia III. Tankönyvkiadó Budapest 1962
2. Kiss L.: Az elektrokémiai fémoldódás kinetikája Akadémiai Budapest 1980
3. Dévay J.: Fémek korróziója és korrózióvédelme Muszaki Budapest 1979
4. Bockris J. O'M., Reddy A. K. N.: Modern Electrochemistry Vol.2 3. Ed. Plenum New York 1973
5. Gellings P.J.: Introduction to Corrosion Prevention and Control for Engineers Delft University Delft



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1976 6. Comprehensive Treatise of Electrochemistry Vol.4 Electrochemical Materials Science Ed. Bockris J. O'M., Conway B. E., Yeager E. White R.E. Plenum New York 1981 7. Corrosion Basics NACE Huston 1984 8. Comprehensive Chemical Kinetics Vol.28 Reactions at the Liquid-Solid Interface Ed. Compton R. G. Elsevier Amsterdam 1989 9. Bockris J. O'M., Khan U. N.: Surface Electrochemistry Plenum New York 1993 10. R. Donndorf: Szerkezeti anyagok és korrózió elleni védelem a vegyiparban. Muszaki Könyvkiadó, Bp. 1982.