



Swedish Research School in Tribology

Applied Electrochemistry including Tribocorrosion

Luleå University of Technology

April 17-20, 2012

(Lecture room: E632 "studio")

Course plan

Title: *Applied Electrochemistry including Tribo Corrosion*

Points: 4 hp

Time: April 17-20 2012

Objectives:

- To understand what is the driving forces for corrosion
- To understand various processes that enhance and/or limits corrosion rate.
- To learn how the "normal" corrosion situation is affected by fretting the surface
- To learn how to perform and interpret various types of corrosion testing in general and in particular for tribo corrosion

Contents:

- Chemical Thermodynamics including theory of electrolytes
- Origin and measurements of Electrode potentials
- Electrochemical Equilibrium and Galvanic Cells
- Potential pH diagrams
- Mass transport processes
- Electrochemical kinetics
- Kinetic diffusive systems
- Corrosion in moist environment
- Possible Cathode processes in electrochemical corrosion
- Important types of electrochemical corrosion
- Corrosion testing
- Mixed potentials, Evans diagram
- Fretting Corrosion
- Tribo corrosion

Teaching Lectures and laboratory work

Prerequisites: Introduction to tribology and similar courses

Examination: Written exam, laboratory seminars

Grading: Pass or Fail



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Examiners: Ass Prof. Britta Lindholm Sethson (BLS)
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Literature: Book, Handouts, and selected research publications.

Preliminary program

Tuesday 17th April 2012

08:15 - 08:45	Welcome, introduction to teachers and course material (NE and BLS)
08:45 - 09:45	Theory of electrolytes + Chemical Thermodynamics (BLS)
09:45 - 10:00	Coffee break
10:00 - 10:45	Electrode potentials and Galvanic cells (BLS)
10:45 - 10:50	Short break
10:50 - 12:00	Potential pH diagrams and construction of them (BLS)
12:00 - 13:00	Lunch
13:00 - 13:45	Mass transport processes (BLS)
13:45 - 17:00	Laboratory work including introduction and coffee break
18:30	Dinner

Wednesday 18th April 2012

08:15 - 09:45	Tribo-chemistry (IM)
09:45 - 10:00	Coffee break
10:00 - 10:45	Kinetic diffusive systems (BLS)
10:45 - 10:50	Short break
10:50 - 12:00	Possible Cathode processes in electrochemical corrosion (BLS)
12:00 - 13:00	Lunch
13:00 - 17:30	Laboratory work including coffee break
18:30	Evening activities and dinner



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Thursday 19th April 2012

08:15 - 09:45	Corrosion in moist environment (BLS)
09:45 - 10:00	Coffee break
10:00 - 10:45	Important types of electrochemical corrosion (BLS)
10:45 - 10:50	Short break
10:50 - 12:00	Mixed potentials, Evans diagram (BLS)
12:00 - 13:00	Lunch
13:00 - 14:30	Electrochemical Techniques and Corrosion testing (BLS)
14:30 - 17:30	Laboratory work including coffee break
18:30	Dinner

Friday 20th April 2012

08:15 - 09:45	Lubricants and lubrication (MT)
09:45 - 10:00	Coffee break
10:00 - 10:45	Corrosion inhibitors (IM)
10:45 - 10:50	Short break
10:50 - 12:00	Surface analysis (IM)
12:00 - 13:00	Lunch
13:00 - 13:45	Summary
14:15 - 17:00	Laboratory seminars; including coffee