

FUNDAMENTALS OF CORROSION PROCESSES

Introductory meeting

<http://home.agh.edu.pl/~grzesik>

CONSULTATIONS

Zbigniew Grzesik

Wednesday, 9⁰⁰ – 10⁰⁰; A-3, p. 21

tel.: 617-2491

e-mail: grzesik@agh.edu.pl

TOPICS

1. Thermodynamics of processes in high temperature corrosion
2. The kinetics of metal oxidation
3. The mass transport through the compact scale
4. Corrosion of valve steels
5. Selected problems of corrosion processes

Selected problems of corrosion processes

1. Thermodynamic basics of corrosion
2. Defect structure and transport properties of oxides of common metals
3. Defect structure and transport properties of metal sulphides
4. Influence of impurities on the kinetics of metal oxidation/sulphidation
5. Experimental methods in studying kinetics of gas corrosion and oxidation rate laws
6. Experimental methods in studying the mechanism of gas corrosion
7. Wagner's theory of metal oxidation, dissociation theory of scale growth
8. Oxidation of metals and alloys
9. Sulphidation of metals and alloys
10. Corrosion in carbon containing atmospheres - metal dusting
11. Oxidation in complex atmospheres
12. Oxidation in environments containing water vapor
13. Hot corrosion and salt-induced corrosion
14. Coatings for oxidation protection at high temperatures
15. High temperature corrosion in automobile industry
16. Corrosion in aqueous environments

Selected problems of corrosion processes

17. Liquid oxides and oxide evaporation, catastrophic oxidation.
18. Sulphide corrosion of metals and alloys.
19. Oxidation in the presence of water vapor.
20. Hot corrosion and salt-induced corrosion.
21. Corrosion in carbon containing atmospheres.
22. Corrosion in complex atmospheres.
23. High temperature corrosion in automobile industry.
24. Corrosion of ceramic materials.
25. Corrosion in aqueous environments.
26. Atmospheric corrosion. Inhibitors of corrosion.
27. Coatings for corrosion protection.
28. Degradation of materials applied in aeronautics
29. Degradation of materials applied in space.
30. Solar energy and problem of material degradation.
31. Degradation of materials utilized in nuclear plants.

REFERENCES

- 1.S. Mrowec, An Introduction to the Theory of Metal Oxidation, National Bureau of Standards and National Science Foundation, Washington D.C., 1982.
- 2.S. Mrowec and T. Werber, Modern Scaling-Resistant Materials, National Bureau of Standards and National Science Foundation, Washington D.C., 1982.
- 3.S. Mrowec, Defects and Diffusion in Solids, Elsevier, Amsterdam-Oxford-New York, 1980.
- 4.P. Kofstad, High Temperature Corrosion, Elsevier Applied Science, London 1988.
- 5.O. Kubaschewski and B.E. Hopkins, Oxidation of Metals and alloys, Butterworths, 1962.
- 6.N. Birks and G.H. Meier, Introduction to High temperature Oxidation of Metals, Edward Arnold, 1983.
- 7.P. Kofstad, High Temperature Oxidation of Metals, J. Wiley, New York, London, Sydney, 1988.
- 8.A.S. Khanna, Introduction to High Temperature Oxidation and Corrosion, ASM International, Materials Park, 2002.

THE END