

DEGRADATION OF ENGINEERING MATERIALS

Introductory meeting

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

LECTURERS

Jan Deja, Prof. D.Sc. Eng.

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CONTACT

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ORGANIZATION OF SEMINARS

Zbigniew Grzesik

3, 10, 17, 24, 31 March
14, 21, 28 April

Jan Deja

5, 12, 19, 26 May
2, 9, 16 June

TOPICS (Z. Grzesik)

1. The general introduction to the thermodynamics of corrosion processes.
2. Experimental methods in studying the degradation degree of engineering materials.
3. High temperature corrosion of engineering materials in purely oxidizing environments.
4. Sulphide corrosion of metals and alloys.
5. Hot corrosion and salt-induced corrosion.
6. Tribological degradation of engineering materials at elevated temperatures.
7. Volatile and liquid corrosion products.
8. Protective coatings.
9. Oxidation-resistant nanocrystalline coatings.
10. Oxidation of metal-matrix composites.
11. Metal dusting corrosion of engineering materials in petrochemical industry.
12. Corrosion in complex atmospheres.
13. High temperature corrosion of automobile engines.
14. Degradation of engineering materials utilized in coal power stations.
15. Oxidation of Ti-Al intermetallic compounds utilized in aeronautics.

TOPICS (J. Deja)

1. Durability of concrete - general view.
2. Chemical corrosion of concrete.
3. Corrosion of steel reinforcement in concrete.
4. Carbonation of concrete.
5. Frost resistance of building materials.
6. Corrosion of glasses.
7. Alkali-silica reaction of aggregates.
8. Erosion, abrasion and cavitation processes.
9. Degradation of concrete due to alkali-silica reaction of aggregate.
10. Degradation of concrete based on carbonate aggregates due to alkalis.
11. Influence of de-icers on durability of concrete.
12. Fire resistance of concrete.
13. Degradation of synthetic (polymer) building materials.
14. Degradation of wood (timber).

LITERATURE

1. N. Birks, G.H. Meier and F.S Pettit, Introduction to the high temperature oxidation of metals, Cambridge, University Press, 2009.
2. W. Gao, Z. Li, High-temperature Corrosion and Protection of Materials, Woodhead Publishing in Materials, Cambridge, England, 2008.
3. ASM Handbook, Volume 13A, Corrosion: Fundamentals, Testing, and Protection. Materials Park, Ohio, USA, 2003.
4. A.S. Khanna, Introduction to High Temperature Oxidation and Corrosion, ASM International, Materials Park, 2002.
5. P. Kofstad, High Temperature Corrosion, Elsevier Applied Science, London 1988.
6. M.G. Fontana, Corrosion Engineering. Mc-Graw-Hill, 1986.
7. S. Mrowec, An Introduction to the Theory of Metal Oxidation, National Bureau of Standards and National Science Foundation, Washington D.C., 1982.
8. S. Mrowec and T. Werber, Modern Scaling-Resistant Materials, National Bureau of Standards and National Science Foundation, Washington D.C., 1982.
9. M. Pourbaix, Atlas of Electrochemical Equilibria in Aqueous Solutions. NACE International, 1966.

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