

HIGH TEMPERATURE RESISTANT MATERIALS

Introductory meeting

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CONTACT

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Wednesday, 9⁰⁰ – 10⁰⁰; A-3, room 21

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ORGANIZATION OF MEETINGS

No. of meeting	Date	Type of classes	Teacher
1.	25/02	Lecture	Prof. Z. Grzesik
2.	04/03	Lecture	Prof. Z. Grzesik
3.	11/03	Lecture	Prof. Z. Grzesik
4.	18/03	Lecture	Prof. Z. Grzesik
5.	25/03	Seminar	Prof. Z. Grzesik
6.	01/04	Seminar	Prof. Z. Grzesik
7.	08/04	Seminar	Prof. Z. Grzesik
8.	15/04	Seminar	Prof. Z. Grzesik
9.	29/04	Lecture	Dr G. Smoła
10.	06/05	Lecture	Dr G. Smoła
11.	13/05	Lecture	Dr G. Smoła
12.	20/05	Seminar	Dr G. Smoła
13.	27/05	Seminar	Dr G. Smoła
14.	03/06	Seminar	Dr G. Smoła
15.	10/06	Seminar	Dr G. Smoła

LECTURES

1. High temperature materials – introductory remarks
2. Basic chemistry and thermodynamics of high-temperature materials.
3. Disorder and transport properties of (Co,Cu,Mg,Ni,Zn)O high entropy oxide
4. Oxidation of high-temperature aerospace materials
5. Design strategies for new oxidation-resistant high temperature alloys.
6. High temperature electronics
7. High temperature sensors
8. High temperature actuators and motors
9. Methods for monitoring high temperature material conditions

SEMINARS

1. Thermodynamic calculations in protection against high temperature corrosion
2. Temperature-dependent properties, calculations
3. Methods of high temperature materials fabrication
4. DCP method in fabrication of novel composite materials
5. Tribological degradation at elevated temperature
6. Degradation of high temperature carbides
7. High temperature materials in the petrochemical industry
8. Materials for modern incinerators
9. Synthesis of artificial diamonds
10. Transmutation of mercury into gold
11. SiCN and SiN for high temperature applications
12. Ceramic nanocomposites
13. Oxide nanopowders for ceramics manufacturing
14. Hydrogen-resistant austenitic steels
15. Adhesives for high temperature applications
16. High temperature drilling mechanisms
17. Characterisation methods of high temperature materials: imaging and visualisation analyzers
18. Characterisation methods of high temperature materials: materials and metallurgical analyzers
19. Thermoelectric generators
20. Metal-joining processes
21. High temperature solid oxide fuel cells
22. Materials degradation induced by high temperature phase transformation

LITERATURE

1. Y. Bar-Cohen, High Temperature Materials and Mechanisms. CRC Press, Boca Raton, USA, 2014.
2. W. Gao, Z. Li, High-temperature Corrosion and Protection of Materials. Woodhead Publishing in Materials, Cambridge, England, 2008.
3. N. Birks, G.H. Meier and F.S Pettit, Introduction to the high temperature oxidation of metals. University Press, Cambridge 2009.
4. ASM Handbook, Volume 13A, Corrosion: Fundamentals, Testing, and Protection. Materials Park, Ohio, USA, 2003.
5. S. Mrowec and T. Werber, Modern Scaling-Resistant Materials, National Bureau of Standards and National Science Foundation, Washington D.C., 1982.

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