

## **Lecture Notes:**

# **Thermodynamics and Kinetics of Materials**

Autumn 2010

## **PhD Course**

### **Titles:**

- Thermodynamic Laws and their applications in materials systems
- Availability and Efficiency
- Solutions and alloys
- One, two and three components phase diagrams
- Mass action Law
- Fick's Laws and their applications
- Kinetic models
- Phase transformations
- Practical examples

### **References:**

1. K. Sankaranarayanan, J.S. Arons, and H. Kooi, "Efficiency and Sustainability in the Energy and Chemical Industries: Scientific Principles and Case Studies", CRC Press, (2004), ISBN 978-0824708450.
2. C.H.P. Lupis, "Chemical Thermodynamics of Materials", Elsevier Science Ltd, (1983), ISBN 978-0444007797.
3. S.K. Sadrnezhaad, "Kinetic Processes in Materials Engineering and Metallurgy", 3rd Edition, Amir Kabir Publishing Corporation, Tehran, Iran, (2008), ISBN 1-72008-0.