

Metallurgical and Materials Engineering Department

N.I.T. Srinagar, Hazratbal, Srinagar,

Semester: 5th

Subject: Thermodynamics and Kinetics of Materials

Text Books

1. The physical chemistry of metallurgical processes - **A.K. Biswas**
2. Principles of extractive metallurgy - **A. Lhosh & H.S. Ray**
3. Phase transformation in materials - **R.C. Sharma**
4. Metallurgical thermodynamics calculation - **G.S. Upadhyay**
5. Kinetics of metallurgical reactions - **H.S. Ray**
6. Non-ferrous metallurgy - **H.S. Ray, Abraham & Sridhar**
7. Rate process in metallurgy - **A.K. Mohanty**

Minor I

Solutions (Metallurgical Affects) – Integral and partial molar properties, chemical potentials. Partition function statistical treatment of entropy – statistical mechanics, statistical calculation of entropy. Continuity equation, laminar boundary for flow on a flat plate.

Tutorials – TSI

Minor II

Materials Kinetics – Reaction rate, uni molecular and bi molecular reaction. Kinetics of iron ore pellet reduction. Boudouard curve and fork diagram

Tutorial – TSII

End Term

Heterogeneous system–Metallurgical equilibrium, diffusion matano interface and Kirkendal effect. Introduction to mass transfer, steady state mass transfer coefficient, effective concentration boundary layer. Numerical based on above topics.

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