

Corrosion- Part1

SWAYAM PRABHA Free DTH Channel for Education _____ SWAYAM Prabha Course Code- M19

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The course will begin with emphasis on the importance of studying Corrosion of materials.Fundamentals of corrosion will be addressed from the angle of thermodynamics and kinetics of electrochemicalphenomena. Different forms of corrosion related to materials and mixed potential theory will be discussed. Finally,electrochemical ways of protection of metals and alloys will be explained.	

COURSE DETAILS

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1	M1L1	Introduction to corrosion - I
2	M1L2	Introduction to corrosion - II
3	M1L3	Types and forms of corrosion
4	M1L4	Uniform and Galvanic corrosion
5	M1L5	Crevice and Pitting corrosion
6	M2L1	Forms of corrosion: Explanation with Examples
7	M2L2	Electrochemical Nature of Corrosion and its Thermodynamics
8	M2L3	Thermodynamics aspects of corrosion-I
9	M2L4	Thermodynamics aspects of corrosion-II
10	M2L5	Thermodynamics aspects of corrosion-III
11	M3L1	Relation Between Free Energy and Equilibrium Constant

13 M3L3 Standard Reduction Potential Series for Pure Metals 14 M3L4 Reduction Potentials in Acidic and Neutral Solutions 15 M3L5 Nernst equation in terms of pH 16 M4L1 Limitations of Standard Reduction Potential Series of Pure Metals 17 M4L2 Concentration Cell Formation and Galvanic Series 18 M4L3 Examples of Concentration cell and Spontaneity of Corrosion Process and Introduction to Pourbaix Diagram 20 M4L4 Spontaneity of Corrosion Process and Introduction of Pourbaix Diagram 21 M5L1 Construction of Pourbaix Diagram 22 M5L2 Construction of Pourbaix diagram for Ni-H2O system-I 23 M5L3 Construction of Pourbaix diagram for Ni-H2O system-II 24 M5L4 Pourbaix diagram of Ni-H2O and AI-H2O 25 M5L5 Inferences from Pourbaix diagram of Fe-H2O and AI-H2O 26 M6L1 Estimation of Corrosion Rate - I 27 M6L2 Estimation of corrosion Rate - II 28 M6L3 Estimation of corrosion Rate - II 29 M6L4 Exchange current Density and Standard hydrogen electrode 31 M7L1 Electrica	12	M3L2	Derivation of Nernst Equation
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Overvoltage 33 M7L3 Introduction to Buttler-Volmer Equation	31	M7L1	
33 M7L3 Introduction to Buttler-Volmer Equation	32	M7L2	
34 M7L4 Derivation of Tafel Equation	33	M7L3	
	34	M7L4	Derivation of Tafel Equation

35	M7L5	Tafel Plot and Activation Polarization
36	M8L1	Activation polarization, concentration polarization and total polarization
37	M8L2	Summary of concentration polarization (CP) and introduction to mixed potential theory-I
38	M8L3	Mixed potential theory-II
39	M8L4	Understanding of mixed potential theory through the case studies and events of corrosion-I
40	M8L5	Understanding of mixed potential theory through the case studies and events of corrosion-II
41	M8L6	Understanding of mixed potential theory through the case studies and events of corrosion-III

References if Any: None