



Fundamentals on Corrosion Behaviour of Refractories

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09.00-10.00	1. <u>Introduction and context</u> 1.1. Thermo-chemical equilibrium, thermodynamic aspects 1.2. Solubility 1.3. Kinetic factors 1.4. Examination of refractories on different scales (from lining to microstructures)	JP, TT
10.00-10.30	2. <u>The fundamental mechanisms of corrosion and the solutions to limit the thermochemical degradations</u> 2.1. Wetting, infiltration	CA
10.30-10.45	Coffee Break	
10.45-12.00	2.2. Corrosion by liquid species (metal, slag, molten salts) Transformation of phases Direct dissolution Indirect dissolution, dissolution with precipitation of new compounds, protective in-situ reactions Dissociation, volatilization Oxido reduction, carbo reduction, oxo reduction	TT
12.00-13.30	Lunch Break	
13.30-15.00	2.3. Corrosion by gaseous species (oxygen, alkalis, chlorides, sulfur compounds) Direct attack Structural spalling	JP

	Formation of a protective layer Permeability Condensation of gas and formation of corrosive liquid phases	
15.00-15.15	Coffee Break	
15.15-16.15	3. <u>Tools to study corrosion</u> 3.1. Post mortem examinations of refractories 3.2. Volatility and phase diagrams, Thermodynamic calculations 3.3. Kinetic studies 3.4. Corrosion laboratory tests	TT
16.15-16.30	Break	
16.30-18.00	4. <u>Impact of refractories corrosion on industrial processes</u> 4.1. Steel making 4.1.1. Flow control SEN 4.1.2. Corrosion, cleanliness and steel quality Corrosion reactions between refractories, steel and slag Metallurgical consequences Control of oxide cleanliness Steel desulphurization Ca treatments of alumina de oxidation inclusions Elaboration of ULC steels 4.2. Cement industry Alkali corrosion and alkali corrosion resistance 4.3. Waste incineration Reactions, oxidation resistance	CA JP CA TT

Participation:

The course is focused on

- Students with study majors in refractory and ceramic engineering, metallurgy and materials (Master or PhD level)
- Interested engineers with an employment in the refractory manufacturing or refractory consuming industry
- One main focus is the iron and steel industry but also other high temperature processes are discussed.

Registration fees:

JPY 70,000 per person

JPY 63,000 per person, if three or more individuals from the same facility will attend