Introduction to Refractory Compositions: Course Outline

Learn about all common types of refractories and their chemical compositions

The course will provide participants with a basic knowledge of all common types of refractories. This course addresses most of the significant refractory chemical compositions. The lectures emphasize raw materials, phase relationships, processing, and microstructural-property relationships. Postmortem analyses from industrial applications are also presented. The individual sessions are titled in the accompanying outline of the daily topics.

Class Dates	Topics / Activities During Class

Lecture 1	• Introduction to Refractories
	• Silica Refractories
	  ○ Raw Materials – Silica
	  ○ Phase Relationships
	  ○ Processing
	  ○ Microstructure/Properties
	  ○ Postmortem Analysis
	• Alumino-Silicate Refractories
	  ○ Raw Materials – Alumina-Silica
	  ○ Phase Relationships
	  ○ Processing
	  ○ Microstructure/Properties
	  ○ Postmortem Analysis

Lecture 2	• Basic Refractories
	  ○ Raw Materials – Magnesite, Dolomite, Chrome-Magnesite, Fosterite, Spinel
	  ○ Phase Relationships
	  ○ Processing
	  ○ Microstructure/Properties
	  ○ Postmortem Analysis
	• Insulating Refractories
	  ○ Insulating Firebrick
	  ▪ Processing
	  ▪ Microstructure/Properties
	  ○ Insulating Fiber
	  ▪ Processing
	  ▪ Microstructure/Properties
	  ○ Postmortem Analysis

Lecture 3	• Monolithic Refractories
	  ○ Raw Materials – Hydraulic Cement, No Cement, Chemical Binders
	  ○ Phase Relationships
	  ○ Processing
	  ○ Microstructure/Properties
	  ○ Postmortem Analysis
	• Non-Oxide Refractories
	  ○ Raw Materials – Carbon, Silicon Carbide, Silicon Nitride

	○ Phase Relationships ○ Processing ○ Microstructure/Properties ○ Postmortem Analysis
Lecture 4	• Composite Refractories ○ Raw Materials – Magnesia-Carbon, Alumina-Silicon Carbide-Carbon, Alumina-Carbon ○ Processing ○ Microstructure/Properties ○ Postmortem Analysis • Special Refractories ○ Raw Materials – Zirconia, Zircon, Fusion Cast - Alumina-Zirconia-Silica, Alumina, AluminaChrome, Magnesia-Chrome ○ Phase Relationships ○ Processing ○ Microstructure/Properties ○ Postmortem Analysis