

## Mike's Box of Minerals

### Fused Alumina, Pink

Brits, North West Province, South Africa



Synthetic Industrial Mineral: electrofusion of bauxite (+ chromium oxide = pink, and increases hardness)

Uses: abrasives, refractories

### Andalusite

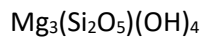
Burgersfort, Limpopo Province, South Africa



Uses: refractories; foundry; ceramics

### Asbestos (Crocidolite, blue asbestos)

Northern Cape, South Africa



Uses: cement; construction; gaskets; friction products eg. brake linings

### Barytes (Barite)

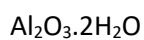
Guizhou, China



Uses: weighting agent in all drilling muds (some cement); chemicals; paints & pigments

### Bauxite

Barro Alto, Goiás, Brazil

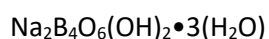


⇒ aluminas, fused alumina

Uses: refractories; abrasives; chemicals; cement; water treatment; flame retardants; metallurgy; heavy weight proppants in fracking

### Kernite (borate mineral)

Boron, California, USA



⇒ sodium borate (borax) ⇒ sodium perborate etc.

Uses: detergents (1907 Degussa/Henkel created new washing powder using sodium **Perborate** and (bleaching soda) **Silicate = Persil**); fertilisers; animal feed; ceramics; glass; food/pharma; chemicals

## **Fluorspar (Fluorite)**

**Las Cuevas, Mexico**

CaF<sub>2</sub>

⇒ Hydrofluoric Acid ⇒ fluorochemicals, fluoropolymers

Uses: chemicals; toothpaste; Teflon; metallurgy; Li-ion batteries (electrolyte/PVDF binders); cement; ceramics; glass; welding

## **Greisen**

**(highly altered granite or pegmatite)**

**Cornwall, UK**

Mainly composed of muscovite mica + quartz; can also host topaz, tourmaline, cassiterite, fluorite, beryl, wolframite, siderite, molybdenite and other sulphides.

⇒ potential source of **lithium** from mica minerals (eg. St. Austell area, Cornwall, British Lithium; Trelavour Hard Rock Lithium Project, Cornwall, Cornish Lithium; Hanns Gully Lithium Project, north Queensland, Boadicea Resources, Australia).

Uses: Li-ion batteries; ceramics; glass; chemicals; pharma

## **Calcined Kaolin**

**(Flint Clay, Fire Clay, Refractory Clay, Chamotte)**

**Tianjin, China (lump); Wrens, Georgia (manufactured proppants)**

Al<sub>2</sub>O<sub>3</sub>.2SiO<sub>2</sub>.2H<sub>2</sub>O

Synthetic Industrial Mineral: calcination of kaolin

Uses: refractories; ceramics; paper; paint; plastics; rubber; lightweight proppants for fracking

## **Magnesite**

**Radenthein, Austria (grey); Haicheng, Liaoning, China (white)**

MgCO<sub>3</sub>

⇒ caustic calcined magnesia, dead burned magnesia, fused magnesia

Uses: refractories; steelmaking; animal feed; fertiliser; cements; chemicals; construction; water neutralisation; FGD; flame retardants; food/pharma

## **Dead Burned (Sintered) Magnesia**

**Veendam, Netherlands (nedMag99); Brumado, Bahia, Brazil (M-30)**

MgO (99% MgO (nedMag99), 98% MgO(M-30))

Synthetic Industrial Mineral: high temperature calcination of magnesite

Uses: refractories; welding; cement

## **Magnesium metal**

### **Boulder, Colorado, USA**

Mg

Synthetic: Garrison Minerals/Big Blue Technologies' Aluminothermal Reduction (ATR) process reacts magnesium-bearing ore (eg. magnesite, serpentinite, olivine) with aluminium to produce Mg metal and MgO-Al<sub>2</sub>O<sub>3</sub> spinel by-product.

**30 April 2023:** Three successful test runs from new pilot plant produced 50lbs Mg metal and >100 lbs of magnesium aluminate spinel.

Uses: aluminium alloys; automobiles; aircraft; lightweight metal products; metallurgy

## **Fused Magnesia**

### **Dashiqiao, Liaoning, China**

MgO (97-98% MgO)

Synthetic Industrial Mineral: electrofusion of magnesite or caustic calcined magnesia

Uses: refractories; heating element coatings; ceramics; foundry

## **Mica (biotite)**

### **Southern Norway**

$K(Mg,Fe)_3AlSi_3O_{10}(F,OH)_2$

Uses: cement; cosmetics; drilling; paints; plastics; rubber

## **Obsidian (volcanic glass)**

### **Central Oregon, USA**

70-75% SiO<sub>2</sub>, + Al<sub>2</sub>O<sub>3</sub>, MgO, Fe<sub>3</sub>O<sub>4</sub>

Uses: cutting tools; ornamental; gemstone

## **Silicon Carbide**

### **Delfzijl, Netherlands**

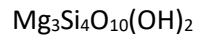
SiC (black 99% SiC)

Synthetic Industrial Mineral: electrofusion of quartz/sand + petroleum coke

Uses: abrasives; refractories; metallurgy; filtration

## **Talc**

**Pingdu, Shandong, China**



Uses: ceramics; paint; paper; plastics; cosmetics; rubber; fertiliser

## **Wollastonite**

(with garnet)

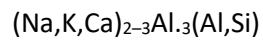
**Lewis, New York, USA**



Uses: ceramics; plastics; paints; glass

## **Zeolite (Clinoptilolite)**

**Ash Meadows, Nevada, USA**



Uses: odour control; radioactive clean-up (St. Cloud Mining's Ash Meadows zeolite was responsible for 70% clean-up of the Fukushima Daiichi nuclear disaster, Japan, March 2011); water treatment; cement; construction; animal feed