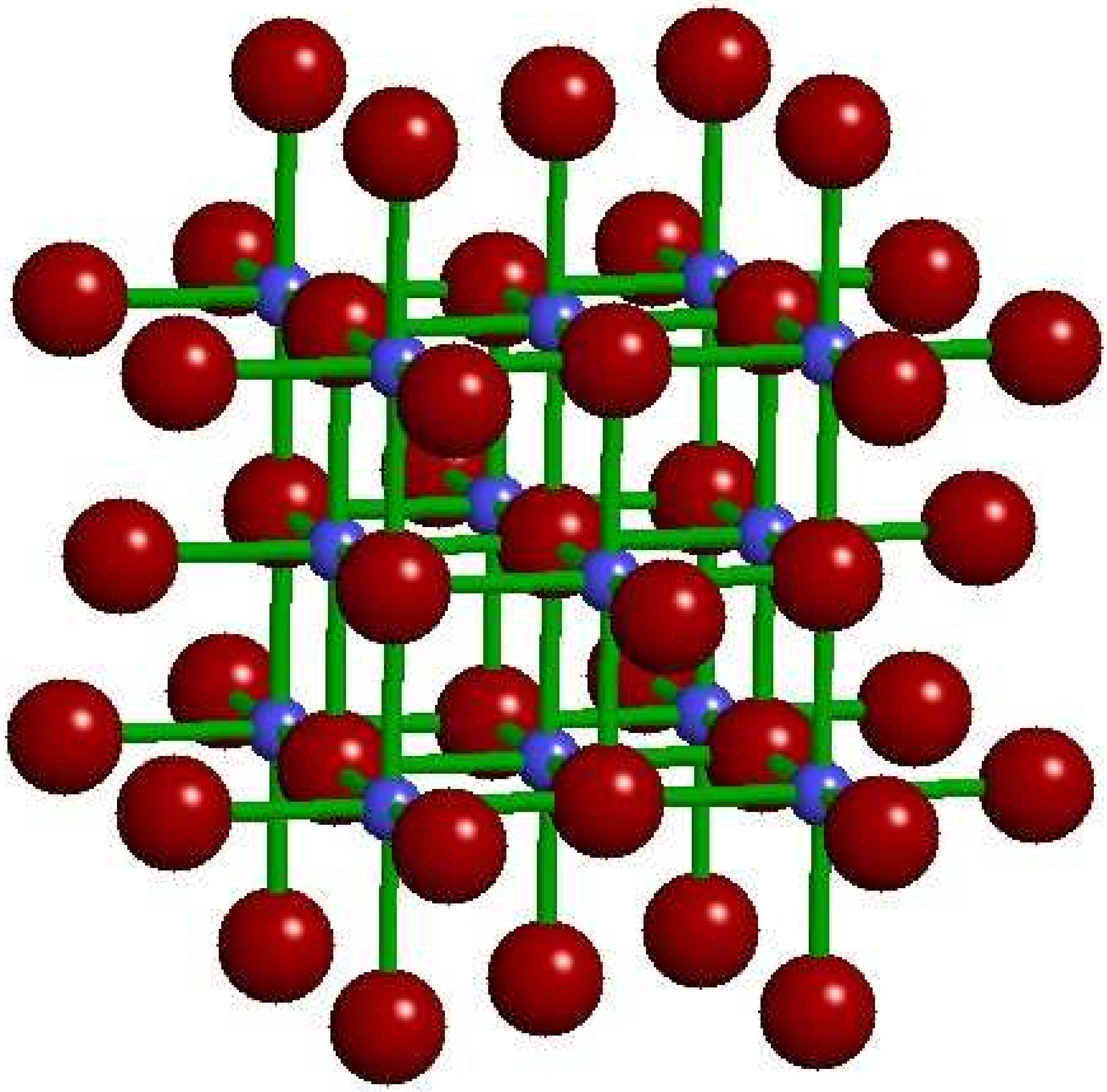
Periclase



PHYSICAL CHARACTERISTICS:

- **Color** is colorless, white, gray, yellow to brown or black
- **Luster** is vitreous to adamantine.
- **Transparency** crystals are transparent to translucent.
- **Crystal System** is isometric; 4/m bar 3 2/m
- **Crystal Habits** include the typical cubes and octahedrons as well as rounded indistinct grains.
- **Cleavage** is perfect in three directions forming cubes.
- **Hardness** is 5.5
- **Specific Gravity** is 3.6 (slightly above average)
- **Streak** is white.
- **Other Characteristics:** Crystals may dull in humid air.
- **Associated Minerals** include **brucite**, **dolomite**, **hydromagnesite**, **magnesite**, **spinel**, **chondrodite** and **forsterite.**
- **Notable Occurrences** include Monte Somma, Vesuvius, Italy; Crestmore, California, USA and Nordmark, Varmland, Sweden.
- **Best Field Indicators** are crystal habit, luster, hardness, cleavage, associations and localities.

Magnesite

MgCO3

Also MgO

magnesite

Magnesite is magnesium carbonate, $MgCO_3$. Iron (as Fe^{2+}) substitutes for Mg with a complete solution series with siderite, $FeCO_3$. Calcium, manganese, cobalt, and nickel may also occur in small amounts. Dolomite, $(Mg,Ca)CO_3$, is almost indistinguishable from magnesite.

Magnesite occurrs as veins in and an alteration product of serpentine and other magnesium rich rock types in both contact and regional metamorphic terranes. These magnesites often are cryptocrystalline and contain silica as opal or chert.

Magnesite	
Image needed	
General	
Category	Mineral
Chemical formula	magnesium carbonate:$MgCO_3$
Identification	
Color	White
Crystal habit	usually massive, rarely as rhombohedrons or hexagonal prisms
Crystal system	trigonal; bar 3 2/m
Cleavage	[1011] Perfect, [1011] Perfect, [1011] Perfect
Fracture	Brittle - Conchoidal
Mohs Scale hardness	3.5 - 5
Luster	Vitreous
Refractive index	Uniaxial (-) nω=1.508 - 1.510 nε=1.700
Pleochroism	N/A
Streak	white
Specific gravity	3.0 - 3.2
Fusibility	infusible
Solubility	Effervesces in hot HCl
Other Characteristics	

References and external links

- Dana's Manual of Mineralogy ISBN 0471032883
- Mineral Galleries
- Webmineral.com
- Mindat.org
- Minerals.net

Active Magnesium Oxide Israel Chemicals

A highly reactive Magnesia for use in the manufacture of ABS resin; as an acid acceptor in halopolymer systems. For use in the manufacture of adhesives and rubber based on polychloroprene; in the compounding of synthetic rubber.
This grade is particularly suitable for applications where fine particle size is critical.

Chemical Analysis	Specification	Typical Value
Magnesium Oxide as MgO (Ignited basis, by difference)	97.0% min.	99.5%
Calcium as CaO	1.0% max.	0.15%
Silicon as SiO_2	0.35% max.	0.04%
Iron as Fe_2O_3	0.05% max.	0.01%
Aluminium as Al_2O_3	0.1% max.	0.004%
Chloride as Cl	0.30% max.	0.15%
Sulphate as SO_4	1.0% max.	0.18%
Sodium as Na	0.1% max.	0.02%
Potassium as K	0.04% max.	0.005%
Loss on ignition (900°C)	8.5% max.	7.0%

Martin Marietta

DESCRIPTION	MagChem® P98-30 is a high purity, technical grade of magnesium oxide processed from magnesium-rich brine and shaft kiln calcined. MagChem P98-30 has a high density and low reactivity.
COMPOSITION	

	Typical
Magnesium Oxide (MgO), % by wt., min.	98.10
Calcium Oxide (CaO), % by wt., max.	0.90
Silicon Oxide (SiO_2), % by wt., max.	0.60
Iron Oxide (Fe_2O_3), % by wt., max.	0.20
Aluminum Oxide (Al_2O_3), % by wt., max.	0.20
Boron (B_2O_3), % by wt., max.	0.07
Loss on Ignition, % by wt., max.	0.15

USES

INDUSTRIAL USES OF MAGNESIUM OXIDE:

Abrasives	As a binder in grinding wheels
Animal feed supplement	Source of magnesium ions for chickens, cattle and other animals
Boiler (oil-fired) additives	Raises melting point of ash generated to produce a friable material that is easily removed; reduced corrosion of steel pipes holding steam as well as sulfur emissions into the environment
Boiler feedwater treatment	Reduces iron, silica and solids
Chemicals	Starting point for the production of other magnesium salts such as sulfate and nitrate
Coatings	Pigment extender in paint and varnish
Construction	Basic ingredient of oxychloride cements used for flooring, wallboard, fiber board, and tile
Electrical	Semi-conductors; heating elements insulating filler between wire and outer sheath
Fertilizers	Source of essential magnesium for plant nutrition
Foundries	Catalyst and water acceptor in shell molding
Glass manufacture	Ingredient for specialty, scientific and decorative glassware and fiberglass
Insulation	Light, flexible mats for insulating pipes
Lubricating oils	Additive to neutralize acids
Pharmaceuticals	Special grades of magnesium hydroxide, oxide and carbonate are used in antacids, cosmetics, toothpaste, and ointments
Plastics manufacture	Filler, acid acceptor, thickener catalyst and pigment extender
Refractory and ceramics	Basic ingredient in product formulations for the steel industry
Rubber compounding	Filler, acid acceptor, anti-scorch ingredient, curing aid, pigment
Steel industry	Annealing process; coating for grain-oriented silicon steel used in electrical transformers
Sugar refining	Reduces scale build-up when used in juice clarification and precipitation

השימוש החדש – לוחות בניה

בעבר – לוחות אזבסט - טעות היסטורית

כיום – לוחות גבס - רבי חסרונות

בעתיד – לוחות מגנסיום חמצני

FRAMECAD® Magnesium Oxide Board is:

- Non-combustible Class A Building Material
- Breathable and porous for strong coating and adhesive bond
- For ALL Residential, Commercial, Industrial and Institutional Construction
- Excellent acoustic dampening material with higher density and elasticity
- Refractory material for infrared radiation (heat) assisting to reduce loss of energy when heating or cooling by reducing conductivity.
- Non-hazardous, natural, non-toxic and disposable as crushable clean fill.
- Stronger and more rigid to allow thinner material to do the same job
- Easier to work with using all types of hand tools and wood working equipment but also can be cut with quick score and snap faster than drywall

MAGNESIUM COMPOUNDS END-USE STATISTICS[1]
U.S. GEOLOGICAL SURVEY
[Metric tons of magnesium oxide content]
Last modification: September 15, 2005

Year	Refractories	Chemicals	Apparent consumption
1975	1,250,000	131,000	1,380,000
1976	1,290,000	111,000	1,400,000
1977	1,270,000	113,000	1,380,000
1978	1,310,000	121,000	1,430,000
1979	1,350,000	151,000	1,510,000
1980	1,040,000	141,000	1,180,000
1981	1,010,000	164,000	1,170,000
1982	740,000	141,000	881,000
1983	842,000	174,000	1,020,000
1984	881,000	217,000	1,100,000
1985	667,000	211,000	877,000
1986	624,000	284,000	907,000
1987	751,000	257,000	1,010,000
1988	887,000	335,000	1,220,000
1989	779,000	312,000	1,090,000
1990	685,000	289,000	973,000
1991	587,000	310,000	897,000
1992	617,000	292,000	909,000
1993	647,000	332,000	978,000
1994	655,000	315,000	972,000
1995	730,000	322,000	1,050,000
1996	592,000	342,000	934,000
1997	615,000	388,000	1,000,000
1998	627,000	471,000	1,100,000
1999	720,000	381,000	1,100,000
2000	806,000	370,000	1,180,000
2001	695,000	355,000	1,050,000
2002	590,000	376,000	967,000
2003	564,000	444,000	1,010,000

[1]Compiled by D.A. Buckingham and D.A. Kramer.

Production

WORLD MAGNESIUM COMPOUNDS ANNUAL PRODUCTION CAPACITY, DECEMBER 31, 2008[1, 2]

(Thousand metric tons, MgO equivalent)

Country	Raw material				Total
	Magnesite		Seawater or brines		
	Caustic-calcined	Dead-burned	Caustic-calcined	Dead-burned	
Australia	78	120	--	--	198
Austria	70	405	--	--	475
Brazil	66	320	--	--	386
Canada	50	--	--	--	50
China	430	2,270	--	10	2,710
France	--	--	30	--	30
Greece	120	100	--	--	220
India	20	202	--	--	222
Iran	25	40	--	--	65
Ireland	--	--	--	90	90
Israel	--	--	10	60	70
Italy	25	--	--	--	25
Japan	--	--	55	200	255
Jordan	--	--	10	50	60
Korea, North	20	100	--	--	120
Korea, Republic of	--	--	--	40	40
Mexico	--	--	15	95	110
Netherlands	--	--	10	165	175
Norway	--	--	25	--	25
Poland	--	10	--	--	10
Russia	100	2,400	--	--	2,500
Serbia	--	40	--	--	40
Slovakia	--	465	--	--	465
South Africa	12	--	--	--	12
Spain	140	70	--	--	210
Turkey	20	404	--	--	424
Ukraine	--	120	20	80	220
United States	140	--	201	195	536
Total	1,320	7,060	376	985	9,740

-- Zero.

WORLD MAGNESIUM COMPOUNDS ANNUAL PRODUCTION CAPACITY, DECEMBER 31, 2014[1,2]

(Thousand metric tons, MgO equivalent)

Country	Raw material				Total
	Magnesite		Seawater or brines		
	Caustic-calcined	Dead-burned	Caustic-calcined	Dead-burned	
Australia	218	110	--	--	328
Austria	76	325	--	--	401
Brazil	96	380	12	--	488
Canada	100	--	--	--	100
China	1,440	2,740	--	--	4,180
France	--	--	30	--	30
Greece	90	110	--	--	200
India	20	202	--	--	222
Iran	25	40	--	--	65
Ireland	--	--	--	90	90
Israel	--	--	10	60	70
Italy	25	--	--	--	25
Japan	--	--	50	70	120
Jordan	--	--	10	50	60
Korea, North	25	100	--	--	125
Korea, Republic of	--	--	--	40	40
Mexico	--	--	15	95	110
Netherlands	--	--	10	205	215
Norway	--	--	30	--	30
Poland	--	10	--	--	10
Russia	380	2,500	--	--	2,880
Saudi Arabia	39	32	--	--	71
Serbia	--	35	--	--	35
Slovakia	--	465	--	--	465
South Africa	12	--	--	--	12
Spain	150	70	--	--	220
Turkey	106	544	--	--	650
Ukraine	--	170	20	80	270
United States	140	--	191	195	526
Total	2,940	7,730	378	885	12,000

MAGNESIUM COMPOUNDS STATISTICS[1]
U.S. GEOLOGICAL SURVEY
[All values in metric tons (t) of magnesium oxide content unless otherwise noted]
Last modification: January 30, 2015

Year	Production	Imports	Exports	Apparent consumption	Unit value ($/t)	Unit value (98$/t)	World production (gross weight)
1990	828,000	244,000	97,800	973,000	299	373	10,500,000
1991	733,000	259,000	94,500	897,000	343	411	9,790,000
1992	693,000	297,000	81,300	909,000	320	372	10,200,000
1993	640,000	425,000	86,200	978,000	331	373	8,280,000
1994	572,000	476,000	76,300	972,000	340	374	9,020,000
1995	597,000	544,000	89,600	1,050,000	407	435	10,600,000
1996	645,000	398,000	109,000	934,000	412	428	11,000,000
1997	667,000	430,000	92,900	1,000,000	432	439	10,100,000
1998	609,000	570,000	81,300	1,100,000	391	391	11,400,000
1999	655,000	532,000	86,200	1,100,000	380	372	9,830,000
2000	614,000	655,000	92,900	1,180,000	406	384	12,700,000
2001	643,000	509,000	103,000	1,050,000	425	391	11,100,000
2002	517,000	559,000	109,000	967,000	439	398	14,100,000
2003	546,000	551,000	87,900	1,010,000	512	453	14,100,000
2004	484,000	590,000	57,000	1,020,000	595	513	16,500,000
2005	499,000	648,000	52,000	1,100,000	594	496	15,600,000
2006	468,000	615,000	47,000	1,040,000	602	487	14,400,000
2007	567,000	592,000	43,000	1,120,000	531	417	20,300,000
2008	454,000	567,000	41,000	980,000	517	391	21,200,000
2009	396,000	287,000	21,500	660,000	582	442	18,300,000
2010	434,000	462,000	27,100	869,000	601	449	21,200,000
2011	507,000	523,000	33,800	997,000	629	456	27,300,000
2012	405,000	432,000	30,800	806,000	501	356	23,300,000
2013	493,000	382,000	34,400	840,000	510	357	24,800,000

NA Not available.

MAGNESITE: WORLD PRODUCTION, BY COUNTRY

(Metric tons)

Country	2004	2005	2006	2007	2008[e]
Australia	473,983	474,000	446,000	447,000 [r]	450,000
Austria, crude	715,459 [r]	693,754 [r]	769,188 [r]	811,556 [r]	800,000
Brazil, beneficiated	366,174	386,759	382,718 [r]	399,314 [r]	400,000 [p]
Canada[e, 3]	180,000	180,000	180,000	180,000	180,000
China[e]	6,500,000	6,600,000	6,700,000	8,000,000 [r]	10,000,000
Colombia[e]	36,000 [r]	38,000 [r]	40,000 [r]	42,000 [r]	44,000
Greece, crude	499,474	475,670	463,277 [r]	351,414 [r]	350,000
India[e]	370,000	380,000	370,000	360,000	350,000
Iran	88,194	114,708	110,000 [e]	110,000	110,000
Korea, North[e]	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Pakistan	6,074	3,029	1,884 [r]	1,400 [r]	1,600
Poland, concentrate	57,900	57,000 [r]	63,000 [r]	65,000 [r]	65,000
Russia[e]	1,200,000	1,100,000	1,200,000	1,200,000	1,200,000
Serbia, crude[e]	20,000 [4]	20,000 [4]	20,000	20,000	20,000
Slovakia, concentrate	404,776	447,700	555,710	457,763 [r]	460,000
South Africa	65,900	54,800	73,300	80,700 [r]	81,000
Spain	567,504	556,129 [r]	539,239 [r]	461,901 [r, p]	460,000
Turkey, run-of-mine	3,732,952	2,372,206	2,088,033	2,100,000	2,100,000
United States	W	W	W	W	W
Zimbabwe	749	893	939 [r]	2,000 [r, e]	2,000
Total	16,500,000	15,200,000 [r]	15,200,000 [r]	16,300,000 [r]	18,300,000

[e]Estimated. [p]Preliminary. [r]Revised. W Withheld to avoid disclosing company proprietary data; not included in "Total."

MAGNESIUM: ESTIMATED PRIMARY WORLD PRODUCTION, BY COUNTRY[1,2]

(Metric tons)

Country[3]	2009	2010	2011	2012	2013
Brazil	16,000	16,000	16,000	16,000	16,000
China	501,000	654,000	661,000	698,000	770,000
Israel	19,405 [4]	23,309 [4]	26,284 [4]	27,292 [r,4]	28,000
Kazakhstan	21,000	21,000	21,000	21,000	23,000
Korea, Republic of	--	--	--	2,500	7,500
Malaysia	--	--	200 [4]	200 [r]	500
Russia[5]	29,000	29,000	29,000	20,000 [r]	32,000
Serbia	NA [r]	NA [r]	NA [r]	NA [r]	NA
Ukraine	2,000	2,000	2,000	2,000	--
United States	W	W	W	W	W
Total	588,000 [r]	745,000 [r]	755,000 [r]	787,000 [r]	877,000

[r]Revised. NA Not Available. W Withheld to avoid disclosing company proprietary data; not included in

TABLE 1

SALIENT MAGNESIUM COMPOUND STATISTICS[1]

(Thousand metric tons and thousand dollars)

	2007	2008	2009	2010	2011
United States:					
Caustic-calcined and specified magnesias:					
Shipped by producers:[2]					
Quantity	125	170	147	162	155
Value------------------------------------	41,100	52,700	42,200	47,000	48,800
Exports[3]	4	1	1	(4)	(4)
Imports for consumption[3]	134	167	126	127	111
Refractory magnesia:					
Shipped by producers:					
Quantity	W	W	W	W	W
Value------------------------------------	W	W	W	W	W
Exports	22	22	8	9	18
Imports for consumption-	437	386	151	323	384
World, production of magnesite	20,300	21,400 r	18,200	20,000 r	20,500 e

Magnesite

	Mine production		Reserves[4]
	2011	2012[e]	
United States	W	W	10,000
Australia	86	90	95,000
Austria	219	220	15,000
Brazil	140	140	86,000
China	4,180	4,300	500,000
Greece	86	90	80,000
India	101	100	20,000
Korea, North	43	45	450,000
Russia	346	350	650,000
Slovakia	172	180	35,000
Spain	133	130	10,000
Turkey	288	300	49,000
Other countries	135	150	390,000
World total (rounded)	[5]5,930	[5]6,100	2,400,000

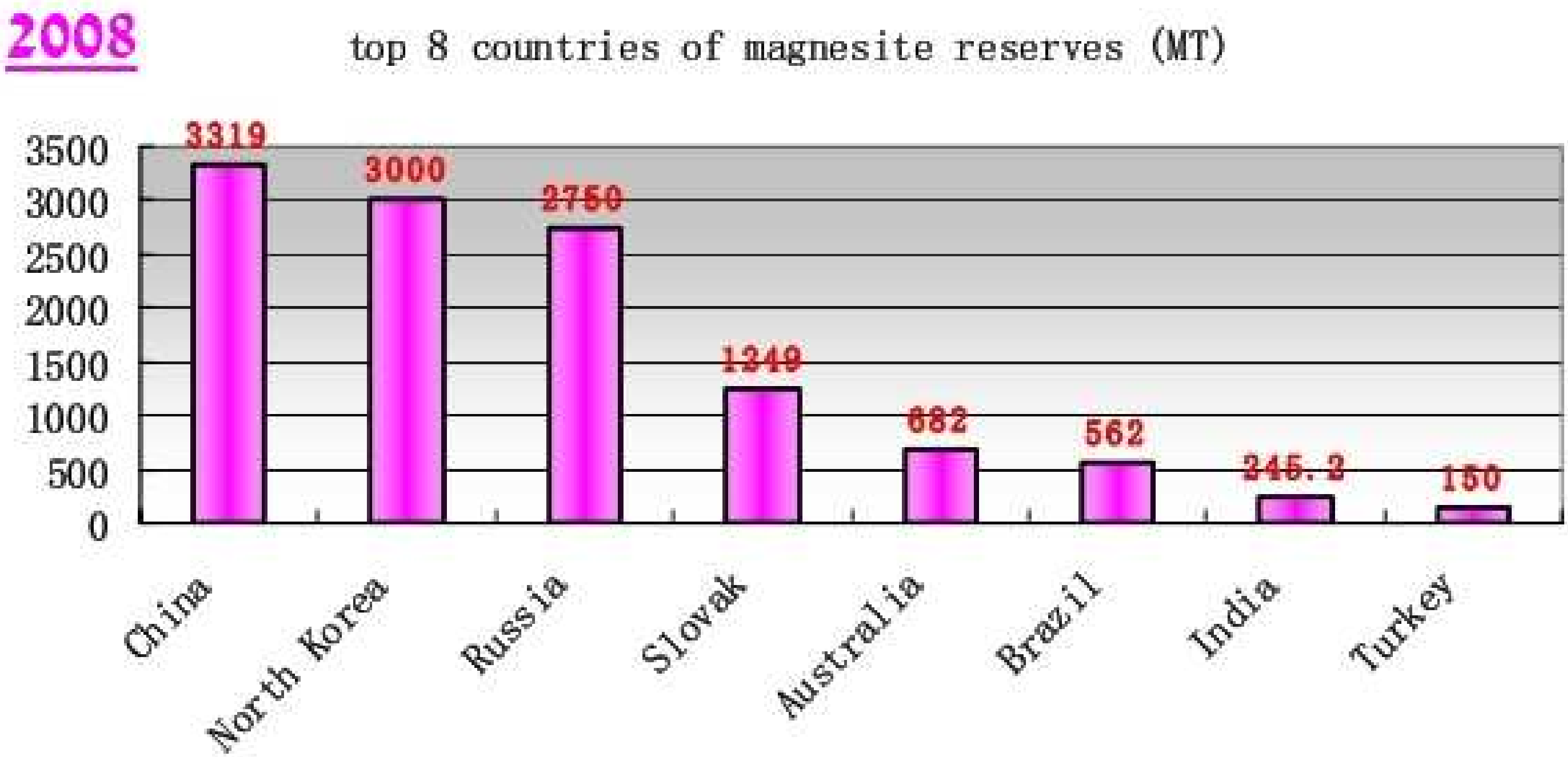
World Magnesite Mine Production and Reserves:

	Mine production		Reserves[4]
	2012	2013[e]	
United States	W	W	10,000
Australia	86	90	95,000
Austria	250	250	15,000
Brazil	140	140	86,000
China	4,600	4,000	500,000
Greece	86	100	80,000
India	100	100	20,000
Korea, North	45	150	450,000
Russia	350	400	650,000
Slovakia	170	200	35,000
Spain	120	120	10,000
Turkey	300	300	49,000
Other countries	100	110	390,000
World total (rounded)	[5]6,350	[5]5,960	2,400,000

In addition to magnesite, there are vast reserves of well and lake brines and seawater from which magnesium

World Magnesite Mine Production and Reserves:

	Mine production		Reserves[4]
	2013	2014[e]	
United States	W	W	10,000
Australia	130	130	95,000
Austria	220	200	15,000
Brazil	140	150	86,000
China	4,900	4,900	500,000
Greece	100	115	80,000
India	60	60	20,000
Korea, North	70	80	450,000
Russia	370	400	650,000
Slovakia	200	200	35,000
Spain	280	280	10,000
Turkey	300	300	49,000
Other countries	130	150	390,000
World total (rounded)	[5]6,910	[5]6,970	2,400,000


2008
top 8 countries of magnesite reserves (MT)
3500
3000
2500
2000
1500
1000
500
0
3319
3000
2750
1349
682
562
245.2
150
China
North Korea
Russia
Slovak
Australia
Brazil
India
Turkey

Prices

Prices

2002

Very wide variations… orders of magnitude...

Magnesite:	< $US 60 /t
Caustic magnesia:	$US 100 – $US 400 /t
Refractory magnesia:	$US 100 – $US 400 /t
Fused magnesia:	$US 250 – $US 900 /t
Hydroxide:	$US 225 – $US750 /t

→ Increasing purity

תהליכי היצור

תגובה של תמלחות או מי ים עם דולומיט טחון.
קלצינציה של מגנסיום פחמתי.
ממגנסיום כלורידי בתהליך אמן
מתגובה של סודה קאוסטית עם מגנסיום כלורידי וקלצינציה.

Production of Magnesium Oxide:

First, naturally occurring brine is mixed with both calcined dolime and water to produce an aqueous suspension containing magnesium hydroxide and calcium chloride:

$CaCl_2 + MgCl_2 + H_2O$	+ $(CaO \cdot MgO)$	+ $2H_2O$ --->	$2Mg(OH)_2$	+ $2CaCl_2$	+ H_2O
brine	calcined dolime	water	magnesium hydroxide	calcium chloride	water

The magnesium hydroxide and calcium chloride produced from this reaction exist together but in two distinct physical states: magnesium hydroxide is formed as solid particles while the calcium chloride is dissolved in the liquid or watery phase. An aqueous suspension containing solid particles is also referred to as a slurry.

Dead burned magnesium oxide

Temperatures used when calcining to produce refractory grade magnesia will range between 1500°C - 2000°C and the magnesium oxide is referred to as "dead-burned" since most, if not all, of the reactivity has been eliminated. Refractory grade MgO is used extensively in steel production to serve as both protective and replaceable linings for equipment used to handle molten steel.

5,000 X (surface area: 1.0 - 250 m^2/gr)

Light burned magnesium oxide

The third grade of MgO is produced by calcining at temperatures ranging from 700°C - 1000°C and is termed "light-burn" or "caustic" magnesia. Due to the material's wide reactivity range, industrial applications are quite varied and include plastics, rubber, paper and pulp processing, steel boiler additives, adhesives, and acid neutralization to name just a few.

The Pattinson Process

The Pattinson Process

The Pattinson process is a well-established route for the production of high purity basic magnesium carbonate and magnesium oxide.

The starting material is most often dolomite or, less frequently, an impure magnesium oxide. The dolomite is calcined yielding a mixed oxide, dolime. (1)

$$CaCO_3.MgCO_3 \longrightarrow CaO.MgO + CO_2 \qquad (1)$$

Hydration of the dolime yields a suspension of dolime, known as milk of dolime. (2)

$$CaO.MgO \longrightarrow Ca(OH)_2 . Mg(OH)_2 \qquad (2)$$

Reaction of this slurry with CO_2 results in the dissolution of the magnesium component as soluble magnesium bicarbonate, and conversion of the calcium component to (insoluble) calcium carbonate.(3)

$$Ca(OH)_2.Mg(OH)_2 + CO_2 \longrightarrow CaCO_{3\,(ppt)} + Mg(HCO_3)_2 \qquad (3)$$

The insoluble impurities originally present in the dolomite, such as iron, manganese, aluminium and silicon oxides are not dissolved under these conditions. These impurities remain in the calcium carbonate and essentially determine the purity of this product. Solubilisation of the magnesium values by conversion to the bicarbonate enables separation of the magnesium from the calcium carbonate, which now contains most of the impurities, by the simple unit operation of filtration. The precipitated calcium carbonate (pcc) is collected as a filter cake and dried

The filtrate containing the soluble magnesium bicarbonate is converted by heating into insoluble basic magnesium carbonate (BMC). (4)

$$Mg(HCO_3)_2 \longrightarrow 5MgO.4CO_2.5H_2O_{\text{(solid)}} \qquad (4)$$

The BMC is collected form its mother liquor by filtration and the filter cake is dried.

BMC is one of a family of hydrated magnesium carbonates having composition similar to that shown.

BMC can be calcined to magnesium oxide. (5)

$$\text{BMC} \longrightarrow \text{MgO} \quad (5)$$

BMC and MgO generated from the Pattinson process are in general characterised by their light bulk density and high chemical purity.

BMC is used in a wide variety of applications in the food and pharmaceutical industries, cosmetics, rubber, ink and catalyst production.

Light MgO as generated by the Pattinson process finds wide application in the production of transformer steel, in pharmaceutical and food applications, as a raw material in the production of high purity magnesium derivatives such as citrate, stearate..etc, in the plastics industry in bulk and sheet molding compounds, as well as in rubber and contact adhesives.

High purity magnesium oxide

Due to increases of significantly cheaper foreign sources of magnesium oxide and a widely fluctuating steel market (the biggest user of refractory grade MgO), the focus of major magnesium oxide producers in the United States has turned to improved quality rather than supplying commodity quantities. In order to meet the specialized needs of customers, magnesium oxide is further refined and purified. Usually the magnesium oxide is rehydrated (mixed back with water) to form magnesium hydroxide:

$$2MgO + 2H_2O \text{ ----> } 2Mg(OH)_2 \text{ (slurry)}$$

The slurry form of magnesium hydroxide allows for easier addition of other elements or compounds (in either gaseous or liquid form) to remove contaminants such as calcium, sulfur, and any excess chlorides that may have remained in the original reaction and thereby increases the purity of the product.

Using relatively simple chemistry it is also possible to add certain ingredients to magnesium oxide to generate a broad range of new magnesium based compounds. As in the high purity magnesium oxide process, magnesium hydroxide slurry is a convenient medium for these additions. Examples of typical reactions include:

THE DSP PROCESS

DSP's process and plant employ the unique "Aman Process" which is at the heart of DSP's operation.

DSP's primary raw material is concentrated magnesium chloride brine prepared solely for DSP from Dead Sea brine by a sister company, Dead Sea Works Ltd. This raw material is available in virtually unlimited quantities. Thermal decomposition of the brine in the Aman spray roaster is accomplished by the combustion of clean fuels. In order to eliminate boron content, which is an undesirable contaminant in refractory applications, a specific ion exchange process is employed on the brine prior to the decomposition process.

Consequently, a very pure magnesia is obtained. DSP's product range is therefore free of the impurities present in magnesia from conventional precipitation processes, in which lime or dolomite is reacted with magnesium chloride solution. The crude Aman reactor product is washed to a purity exceeding 99.5% and is then directed along the various process streams for the manufacture of DSP's magnesia products.

במישור רותם, לצידו של כביש דימונה-ערד, מייצרים מגנזיום חמצני בכמות של 40,000 טון בשנה.
הייצור מבוסס על ניצול אוצרות ים-המלח בתהליך עתיר אנרגיה:

$$MgCl_{2(aq)} + H_2O_{(l)} \rightarrow MgO_{(s)} + 2HCl_{(aq)}$$

תוצר הלוואי – מימן כלורי – מוזרם ישירות בצינורות פוליפרופן למפעל השכן,רותם אמפרט נגב, שם הוא מנוצל לייצור חומצה זרחתית. שימוש זה הוא אחד הגורמים שקבע את מיקומו של המפעל במישור רותם הסמוך למרבצי הפוספטים, ולא בקרבה רבה יותר לים המלח, שהוא מקור חומר הגלם: תמלחת עשירה ביוני מגנזיום וביוני כלור.
תמלחת זו מתקבלת ממי ים-המלח לאחר הרחקת כמויות ניכרות של מלח בישול, אשלג ויוני ברום בסדרת תהליכים, אשר בהם יש לשמש תפקיד מרכזי כספק אנרגיה בבריכות האידוי .

א. מתקן "אמן"

תחילה עוברת התמלחת טיפול לסילוק תרכובות בור. לאחר ריכוזה באמצעות חום היא מרוססת אל ראשם של מיכלי תגובה. גז טבעי נשרף במבערים שבתחתית המיכלים. במגע בין גזי השריפה החמים לבין טיפות התמלחת מתאיידים המים ומתרחשת תגובה המוכרת כ"פירוק תרמי של מגנזיום כלורי":

$$MgCl_{2(s)} + H_2O_{(l)} \rightarrow MgO_{(s)} + 2HCl_{(g)}$$

מגנזיום חמצני מתקבל כאבקה לבנה הנופלת לתחתית מיכלי התגובה. מראש המכלים יוצאת התערובת של הגזים החמים – מימן כלורי, קיטור וגזי שריפה.
הגזים החמים מנוצלים להפקת האנרגיה הדרושה לריכוז התימלחת לאחר הזנתה למיכל התגובה. ולאחר התקררותם מועברים הגזים לעמודה שבה נספג $HCl_{(g)}$ במים ומתקבלת תמיסת מימן כלורי בריכוז 18%-20%.
הגזים הנותרים לאחר הספיגה מכילים בעיקר קיטור אשר עובר טיפול להרחקת מזהמים, ובעקבות עיבוי מתקבלים מים הראויים לניצול בתהליכי הייצור. המים המושבים בדרך זו מהווים כמחצית מתצרוכת המים של המפעל.

ב. מתקן "שטיפה"

מגנזיום חמצני גלמי המתקבל בבסיס מיכל התגובה מגיב עם מים ליצירת מגנזיום הידרוקסידי:

$$MgO_{(s)} + H_2O_{(l)} \rightarrow Mg(OH)_{2(s)}$$

לאחר שמאפשרים לתרחיף לשקוע, מבצעים כמה שלבי שטיפה במים המיועדים להרחיק את המלחים המסיסים (בעיקר כלורידים) ולקבל מגנזיום הידרוקסיד מוצק שדרגת נקיונו מעל 99%.

ג. מתקן "סינטור":

סיומו של שלב הסינון האחרון. במתקן השטיפה מקבלים מגנזיום הידרוקסיד בצורת עוגה רטובה – "עוגת מסנן" – אשר מועברת לתנור קלייה, לשם אידוי המים החופשיים שב"עוגה", וקליית ההידרוקסיד היבש לתחמוצת:

$$Mg(OH)_{2(s)} \rightarrow MgO_{(s)} + H_2O_{(g)}$$

בשלב זה מתקבלת אבקה המוכרת כמגנזיום חמצני "קלוי". דרגת הניקיון של תוצר זה גבוהה מאד (כ- 99.4%), [redacted]

(0.8-0.7 גר' לסמ"ק) אינה מתאימה להכנת לבנים חסינות אש, אלא לשימושים אחרים הצורכים רק כמויות קטנות. שיווק אבקת מגנזיום חמצני קלוי נעשה בשקים, באריזות אטומות ללחות או במכלות – לפי דרישת הלקוח. רוב התחמוצת שהתקבלה בקלייה נלחצת ונכבשת לגושים דמויי שקדים, אשר מועברים לתנור שריפה לתהליך הנקרא "סינטור" (Sintering). בטמפרטורה הגבוהה השוררת בתנור השריפה – קרוב ל- $2000^{0}c$ עולה צפיפות התחמוצת עד 3.4 גר' לסמ"ק. בתום פעולות אלה מתקבל הפריקלאס המבוקש – גושי מגנזיום חמצני ("שקדי פריקלאס") בעלי צפיפות גבוהה, המתאימים לייצור לבנים חסינות אש לכורים בתעשיות הפלדה. הפריקלאס משווק בתפזורת.

Periclase

	97% HLS Periclase		98% 1LS Periclase		98% 3LS Periclase	
Analysis (wt %)	Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed
MgO	97.5	97.1 min	98.2	97.7 min	98.3	97.9 min
SiO2	0.29	0.40 max	0.6	0.8 max	0.30	0.40 max
CaO	1.80	2.00 max	0.8	1.0 max	1.00	1.20 max
Fe2O3	0.22	0.25 max	0.24	0.27 max	0.22	0.25 max
Al2O3	0.15	0.20 max	0.19	0.22 max	0.15	0.20 max
B2O3	0.015	0.026 max	0.05	0.06 max	0.03	0.04 max
CaO:SiO2 ratio (wt)	6.2		1.3		3.3	
L.O.I.		0.10 max		0.3 max		0.3 max
Physical Properties						
Bulk Specific Gravity *	3.40	3.39 min	3.36	3.32	3.4	3.38