

# CHINA'S MAGNESITE INDUSTRY: RESOURCES, SUPPLY, & GLOBAL INFLUENCE

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The tide has turned. Developments in China that have continued to unfold over the last four years or so have now reached a point where the supply market dynamics of certain industrial minerals have changed significantly.

No more is this sea change better exemplified than by the supply market for magnesite, and in particular, its processed derivative grades of dead burned magnesia (DBM), caustic calcined magnesia (CCM), and fused magnesia (FM).

But what has compounded the barrage of influencing factors impacting this sector, which include the widespread effects of energy and freight cost increases, has been rising demand from certain end use markets.

Clearly, the magnesia market is experiencing bittersweet conditions. But those western producers which have monitored and responded to this market transformation, stand to taste success in the near and medium future.

## **Revolution in World Supply Status**

In essence, while China, as host to a wealth of magnesite resources in Liaoning province, remains a huge producer of magnesia, its supply dominance on the global magnesia market has been considerably weakened. In future, it will mainly aim to supply domestic, and to some extent east Asian markets.

Magnesia *consumers* outside China are now scrabbling for alternative, "western" sources of supply. At the same time, magnesia *producers* outside China that weathered the storm of low cost Chinese DBM and FM imports flooding their regional markets for the last 20 years (and many did not), are busy

investing in production capacity increases to meet not just demand from falling Chinese supply, but also demand from end use markets which is picking up.

And it is not just a matter of expanding capacity of existing magnesia product lines. In the face of plentiful lower cost DBM and FM substitutes from China over the last couple of decades, many western magnesia producers started to switch their focus to the non-refractory markets (eg. environmental, specialities) which promised lucrative opportunities (and still do) and crucially, a lessening of sales revenue dependence on the DBM refractories market.

Now we have the likes of Baymag (Canada), Bommag (Serbia/Turkey), and Kumas (Turkey) not only expanding capacities but seriously considering diversifying into DBM and FM production. Perhaps DSP (Israel), having ceased its famous high purity DBM activity as recently as 2005, might even reconsider a return to the "other side".

But it's not all DBM and FM. The CCM and specialities markets are also demanding a response, and so Baymag, DSP, Martin Marietta (USA), Premier Chemicals (USA), Qmag (Australia), MGR (Spain), and Magnifin (Austria) are also stepping up to the market on the non-refractory side.

From most accounts, the situation with regard to Chinese supply has been described as one of turmoil, with prices rising, leading to improving opportunities for western producers.

The majors are conducting huge expansion programmes, such as Qmag, Magnezit (Russia), and the new look Magnesita (Brazil). Even smaller players such as Causmag (Australia) and Dalmia (India) are looking to increase production.

In short, the western magnesia supply sector is witnessing a landmark event in capacity investment and market share penetration as China's previously dominant role begins to weaken (for a review of western capacity expansions see *Industrial Minerals*, September 2008, p.28).

## **Merger & Acquisition Activity**

Another response of course has been a raft of mergers and acquisitions in order to secure resources and supply outside China. These have included private equity groups taking over Magnesita and Qmag; Imerys entering the FM business through UCM; Peñoles further consolidating the electrical grade FM market by acquiring Minco; Martin Marietta acquiring Morton Salt's Specialty Magnesia Group; Bomex entering the market through Calmag (now Bommag); LWB acquiring Magnesita; and Magnezit's pursuit of Slovakian magnesia, with Slovmag aboard while currently wooing SMZ.

Interestingly, RHI has gone "the other way", and has invested in a state of the art joint venture operation at Dashiqiao, Liaoning, with which it aims to secure high quality feedstock for its Chinese refractory plants. Tata Refractories Ltd has announced intentions to follow suit, and other majors, such as Qmag are known to be interested in seeking options.

Naturally, there is now renewed interest from several parties in the idled 50,000 tpa DBM/10,000 CCM Jormag facility, Jordan, and the commercially undeveloped Zhargat project, Saudi Arabia. Elsewhere, there will no doubt be suitors for stakes in SMZ, in Slovakia, and Magnohrom, in Serbia, whose respective ownerships are on the block.

## **The "China Factor"**

The "China factor" has been key to magnesia's market change, and has significantly influenced prices and availability of material to global markets.

### ***Resources & production***

China hosts the largest share of the world's magnesite deposits, accounting for

26% or 3,319m. tonnes of predominantly sparry magnesite (followed by North Korea, 24%, and Russia, 22%; Wilson 2008).

China accounts for 44% of total world magnesite mined (19m. tonnes in 2007) and 50% of the total world magnesia produced (8.2m. tonnes CCM, DBM, FM; Wilson 2008). Russia follows China at 13% of magnesia supply, illustrating China's dominance of magnesia production.

Apart from one producer in Shandong province, central eastern China, the country's magnesite resources and production are concentrated around the cities of Haicheng and Dashiqiao in Liaoning province, north-east China.

Although there are also producers in the Xiuyan district of south-east Liaoning, the Haicheng-Dashiqiao Magnesite Belt hosts the majority of producers. In total these may number 200-300 of large, medium, and many small scale producers. However, the provincial government is attempting to streamline the suppliers into fewer, more cost efficient enterprises, and evolve and diversify their product base.

Most of the large producers supply domestic and overseas markets, and also operate integrated refractory brick and monolithic plants, also for domestic and export markets.

Leading Chinese magnesite producers include Xiyang Group, Jiachen Group, Liaoning Houying Group, Haicheng Huayin Group, Haicheng Huayu Group, and Liaoning Jinding Magnesite Group.

### ***Recent supply developments***

In the face of depleting quality of magnesite raw material in Liaoning, widely regarded as seriously impacting CCM feedstock quality for fused magnesia FM production (see later), Haicheng Huayin Group has brought on stream its new high quality magnesite mine in Kamaduo, Tibet.

Reserve evaluation was concluded in August 2006, and the following year Huayin completed construction of the mine and industrial tests of the aphanitic magnesite. Reserves are claimed to be 120m. tonnes and production of crude ore is 500,000 tpa.

A 150,000 tpa CCM plant was established in 2008 to process the Tibetan material, which is then transported to Liaoning as feedstock for Huayin's FM, DBM, and mag-alumina spinel products. Typical CCM chemical composition

is 98.5-99.3% MgO, 0.7% CaO, 0.15% SiO<sub>2</sub>, 0.05% Fe<sub>2</sub>O<sub>3</sub>.

Fengchi Refractories Co. of Haicheng started up DBM production from three new kilns in August 2008. Investment and construction began in 2007 and now the company has an additional 100,000 tpa DBM capacity. Fengchi operates six mines and five plants producing magnesite, CCM, DBM, FM, and a range of refractories.

Liaoning Xiuyan Qinghua Refractories Co. Ltd, a subsidiary of the huge refractories group, Yingkou Qinghua Group, in May 2008 brought on stream four oil kilns and four ultra high temperature kilns. The new kilns added 140,000 tpa high purity DBM and 80,000 tpa high quality magnesite brick capacities.

Liaoning Donghe Refractory Group plans to establish a 80,000 tpa high purity magnesite plant in 2009, aiming at an initial output of 30,000 tpa.

#### ***Overseas interest in Liaoning***

As the global market leader in the refractory industry, as well as a significant captive producer of magnesia in Austria and Turkey, RHI AG, based in Vienna, decided that investment into a high quality magnesia production facility was a priority in order to secure long term supply of the highest quality refractories for its customers.

RHI has formed a j-v with Liaoning Jinding Magnesite Group Co. Ltd., (JDMG), of Dashiqiao, which operates one of the largest magnesite mines in Liaoning (the Huaziyu mine). RHI is to invest more than \$50m. in a raw ore beneficiation and magnesia production plant to produce 100,000 tpa of the highest purity magnesia grades from middle grade raw magnesite. The j-v is called Liaoning RHI Jinding Magnesite Co. Ltd.

Tata Refractories Ltd (TRL), part of Tata Steel, India was reported to be in the process of signing a memorandum of understanding for a magnesite mining lease in China. The mine will make its operations in that country even more cost-effective. Up to now, TRL has bought raw magnesite from Chinese magnesite producers.

The mine is to be located near Bayuquan, Liaoning, in the same district as TRL existing 64,000 tpa magnesite-based refractories plant.

The plant recently completed the second phase of its capacity expansion. The plant's original capacity was 30,000 tpa.

TRL is planning a third phase expansion of the plant that will take capacity to 100,000 tpa.

#### ***Influence on global supply market***

Chinese magnesia export smuggling via the South Korean port of Kunsan en route to Rotterdam, which re-emerged during 2008, has supposedly run its course, ie. this "source" has apparently been stopped by government authorities, but not without ramifications.

It is believed that the smuggling clampdown alone has been the biggest influence on shortages and prices of late and is estimated to have taken about 700,000 tpa out of the market. This has driven up prices significantly and has had a major impact on demand for export licences (as well as driving speculation that smuggling may soon resume).

By October 2008, the price of an export licence for Chinese magnesia was in the region of RMB2,000/tonne (\$293/tonne). Chinese magnesia bulk, FOB prices were in the region of DBM91 \$550/tonne; DBM95 500-600/tonne; and DBM97 650-800/tonne, depending on who one talked to. The views of some traders are that the government will not issue any additional licences for 2008.

Many Chinese magnesia plants have had to close or partially close owing to a lack of fuel, power, and raw magnesite feedstock. They were also hindered during July-September 2008 by the restrictions on drill and blast mining imposed as a result of Olympic Games "controls".

Other factors include the quality deterioration of Chinese DBM and FM over the past two to three years, particularly with regard to 97% MgO DBM. It is understood that this has been due to a combination of limited investment in exploration, poor mine planning practices, high grading the deposits, pressures to reduce cost, and a greater focus on the domestic refractory/steel industry.

Also of significance will be the progress and ramifications of US trade authorities challenging China's export policies in respect of its membership of the World Trade Organisation. This action was instigated in September 2008, largely driven by the US steel sector looking to combat allegedly unfair high prices for Chinese imports of steelmaking raw materials. These included magnesia, amongst other minerals.

The upshot is that the cessation of smuggling, restriction of export licences and

export volumes, declining quality and reduced production, more focus on domestic market supply, will together translate to even tighter magnesite availability from China.

However, despite these overwhelming issues, the longevity of this trend has been questioned. Some observers have warned that a risk still exists that the Chinese magnesite price may collapse in future, since today's price does not reflect the production costs in China.

That said, it is clear that western producers and consumers are already responding by reducing their reliance on Chinese supply, increasing their capacities, and/or securing supply for the future.

## Summary

While China's magnesite industry will remain an important and active sector of China's industrial minerals business, it will increasingly be focused on supplying domestic markets. Without doubt, Chinese magnesite producers will become more efficient and upgrade their facilities over time, and an improvement in grade quality will return. However, when or if this material will return to the global markets in volumes seen over the last two decades remains to be seen, and in the near to medium term (even long term), this appears remote.

Meanwhile, magnesite consuming markets continue to hold promise for a period of high demand – particularly in environmental, hydrometallurgical, and speciality markets for CCM; and steel and cement markets in Brazil, Russia, eastern Europe, and India for DBM and FM.

In response to this market demand, and especially in order to take up any share of the market from declining Chinese magnesite supply, western magnesite producers are busy investing in capacity expansions and diversifying, and in some cases returning to, DBM and FM production.

Such trends and developments will provide a stimulating backdrop for *Industrial Minerals'* upcoming conference for the international magnesite business, **MagMin 2009**, 10-12 May 2009, Amsterdam ([www.indmin.com](http://www.indmin.com)).

These are very much interesting times for the world magnesite market, with China, as ever, influencing its market dynamics.

## References

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