China frustrates

By Kormac Kennedy

A trader attending the recent Refractories & Abrasives Summit 2010 in Beijing, China contacted *SiC & More* to inquire about SiC production capacity in China. “Why is it that China claims to have over 900,000 metric tpy of SiC potential production capacity by the end of 2011, yet the government will not increase the tonnage for export and currently has all furnaces in Ningxia mothballed?” he asked. Difficult questions with no easy answer.

In recent weeks *SiC & More* has updated its production capacity numbers for China and finds that the presentation at the Summit was accurate albeit stunning, reporting 900,000 metric tpy by the end of 2011 while *SiC & More* estimates 928,000 metric tpy. These are amazing estimates. When the world first began trading Chinese SiC in 1990, production capacity was believed to be 150,000 metric tpy. By the end of a ten-year growth spurt China entered the new millennium with capacity of about 690,000 metric tpy. After remaining flat for a number of years the estimate reached about 760,000 metric tpy by the end of 2007.

Another furnace building spree has brought us to the astounding level of 928,000 metric tpy.

Although new furnaces are being built across Gansu, Qinghai and Ningxia provinces the government also restricted energy consumption in Ningxia until the end of December and quite likely into January 2011. Some reports state that the government mandate is due a combination of objectives including energy conservation as well as addressing emission reductions. Although this is frustrating to traders who find that SiC prices increase with each enquiry, even if the Ningxia furnaces were operating at peak efficiency the prospects of exporting SiC would not be very encouraging.

The increased angst by traders is the lack of export licenses. China’s government authorized about 215,000 metric tons of SiC for export in 2010 for all SiC raw materials and for all destinations, a consistent tonnage level since 2001. It is this generic policy that has led to an unbalanced price structure and fear amongst traders that there will be insufficient licenses to satisfy export demand for SiC.

“Over the last six years Sublime has made significant improvements in its production process growing the operation from a pilot plant with 10,000 tpy capacity to what is today. Sublime believes they have the best furnace technology currently in the world today,” said CEO Geordie Osler.Elfusa Electro Abrasives has been importing Sublime...
lower value SiC products. These fears are being realized.

As we enter the final two months of the year, there appears to be about 30,000 metric tons of unused export licenses. It also appears, however, as if this remaining tonnage will be dedicated to exporting higher value-added SiC products such as green micro grits as there is reluctance to dedicate export licenses to met grade products regardless of their destination.

Another frustration is the license cost. Although a price of US$370/metric ton seems acceptable when exporting JIS1200 green SiC, it seems unreasonable for metallurgical grades. Ultimately, with no spot availability for licenses, it is unlikely that traders will have access to metallurgical or even high-grade refractory and/or abrasive macrogrits during the final two months of 2010.

One cannot fault license holders for dedicating quotas to selling JIS1200 green to Japan instead of shipping lower value products. One can, however, feel the frustration of seeing the world’s largest SiC producer manipulate exports via export licenses while also shutting down what amounts to 246,000 metric tpy of SiC production in Ningxia.

“Of course I’m upset. The world is emerging from a 50-year recession and SiC demand remains sluggish yet prices are approaching record levels last seen during early summer 2008. The only thing you can depend on from the Chinese is pure greed,” another trader told SiC & More.

The bottom line is that all SiC prices are going to increase. In addition to the export license issue, there are variables increasing the cost to produce a ton of SiC in China. Energy, petcoke and coal prices continue to climb. Internal freight costs have also increased. In fact, many furnace plants in China claim that the increased cost of production inputs means they are operating near the breakeven point. However, there remains room for hope. Furnace expansions at Sublime in South Africa and Washington Mills in the USA will add some production capacity in 2011. In addition, the impending expansion of Volzhsky in Russia will also provide some relief. The most dynamic item, however, is that Ningxia province should produce SiC again during January or February 2011. This and the anticipated slowing of the Chinese steel industry means it is possible that there will be excess supply which could force prices downward by mid to late 2011. But this could be wishful thinking as China produces over half of the world’s SiC and thus remain the price setters. SiC & More believes that pricing on all SiC products will increase during the final two months of 2010 and into 2011. As the world’s economies continue to recover, demand for SiC is certain to increase thus putting additional pressure on the supply chain.

material into the US and the acquisition fits with its long term strategy. “We need to be able to supply our customers in the abrasive and refractory industries a full line of products and silicon carbide is important to complement this line,” Luiz Curimbaba told SiC & More.

**Americas**

**SiCBras to up #1 grade**

In 2010 Brazilian SiC producer SiCBras has operated at 100% of its capacity. With about 10,000 metric tpy of production, SiCBras will recover over 40% of #1 grade and just under 60% of metallurgical grade. In 2011, however, with a strong sales and marketing thrust into the refractory market, SiCBras hopes to reverse the aforementioned percentages.

SiCBras is contemplating a furnace expansion, however, when and where have still to be answered. Although energy and petroleum coke are readily available to SiCBras, currency issues mean these have high prices making it difficult for the company to compete in the global marketplace.

Over the last six months, SiCBras has experienced reasonable success increasing domestic prices to help cover the continuous increase in energy and petcoke pricing. “The big issue for 2011 will continue being currency,” managing director Joao Frizzone told SiC & More.
Rare earths getting rarer?

By George O’Malley

The US has formally requested that the World Trade Organization (WTO) create a special resolution panel to address China’s decision to restrict exports of key raw materials such as bauxite, silicon carbide, manganese, silicon metal, zinc, etc. This request represents a major issue for future world trade with emphasis on materials that are considered rare. WTO membership does not require a country to export any or all of its natural resources, it only requires that all trading partners be treated equally.

Both mature and emerging industries rely on certain metals that are somewhat scarce. Although supply restriction of the aforementioned materials is important, the supply of rare earth metals (REMs) is an even bigger issue. Global production of REMs is estimated to be 150,000 tons this year and it is commonly thought that China produces 93-97% of the world’s REMs. China has capped its exports to the US for 2010 at 30,000 tons and there is speculation that they may actually ship less. Although the 30,000 tons represents 20% of total REMs production, it is also an astounding 40% reduction from 2009. Unless new supplies are developed, non-Chinese demand is expected to exceed supply by 40,000 tons annually in the years to come.

The US no longer produces any REMs and has no active facilities to do so. According to most experts it would take nearly 10 years to rebuild US domestic supply. In the early 1960s the US was the major supplier of REMs to the world, but while environmental policies discouraged US production, the Chinese began mining rare earth oxides and built facilities to convert them to metal, which was mostly exported at prices considered below production cost.

China produced 125,000 tons in 2008 and exported 70,000 tons. This dropped to 50,000 tons exported in 2009 and in 2010 it may be less than 30,000 tons. Production is still increasing in China and may hit 200,000 tons this year but most production is consumed internally.

Rare earth metals are critical to any technically advanced society. There are 17 REMs and each has significant applications including the production of TVs, energy efficient light bulbs, hard disc drives, self cleaning ovens, security devices, cell phones, solar panels, lasers, computers, nuclear power and all sort of military applications such as guided missiles, super computers, etc. Electric cars have up to 50 lbs of REMs in their batteries, new water treatments utilize REMs and windmills have 200 lbs of rare earth metals.

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metals in their generators, and REM magnets are now utilized in all electric motors and generators.

The importance and scarcity of REMs is such that they came to the forefront of an international dispute between Japan and China over a Chinese fishing crew allegedly fishing in waters off islands claimed by Japan. China threatened to cut off REM exports to Japan if the crew were not released, which they promptly were.

There are a number of mining companies exploring for rare earth deposits. Some have drilled exploratory holes in the US, Canada, South Africa and Australia. When and if these companies start producing rare earth oxides, it is still a long road to producing REM. Moly Corp is activating its Mountain Pass, California plant but it is estimated that no product will be produced until 2011. This is highly optimistic in light of all the environmental permits it requires before production can resume. The plant requires replacement of most machinery and there is a shortage of personnel trained to operate it. A more realistic production target might be 2014. Since the new plant will require substantial capital, Congress is working on a bill to help finance the Mountain Pass plant. This has passed the House but the Senate will not take action on it until next year.

The end result of the REM supply and demand situation for the next 5-10 years will result in much higher prices and severe supply shortages. The impact of the REM industry, even with its relatively small market cap, could be observed recently as the launching of REMX on October 28 by Van Eck Global made national news on CNBC. Other companies such as Moly Corp (MCP) and Rare Element Resources (REE) have enjoyed an exciting ride due to the Chinese “embargo” on REM exports. In fact, as of October 28, Moly Corp was up more than 160% since its late July debut.

2010 World SiC microgrit capacity estimate (net tons)

<table>
<thead>
<tr>
<th>Company</th>
<th>Country</th>
<th>Product</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcoa</td>
<td>Brazil</td>
<td>Black</td>
<td>500</td>
</tr>
<tr>
<td>Various</td>
<td>China</td>
<td>Green (Misc)</td>
<td>1,500</td>
</tr>
<tr>
<td>Various</td>
<td>China</td>
<td>Black</td>
<td>4,000</td>
</tr>
<tr>
<td>CUMI</td>
<td>India</td>
<td>Black</td>
<td>6,000</td>
</tr>
<tr>
<td>Electro Abrasives</td>
<td>USA</td>
<td>Black</td>
<td>1,200</td>
</tr>
<tr>
<td>ESF-SIC</td>
<td>Germany</td>
<td>Black</td>
<td>10,000</td>
</tr>
<tr>
<td>Fujimi</td>
<td>Japan</td>
<td>Black</td>
<td>8,000</td>
</tr>
<tr>
<td>Micro Abrasivos</td>
<td>Mexico</td>
<td>Black</td>
<td>1,200</td>
</tr>
<tr>
<td>Nanko</td>
<td>Japan</td>
<td>Black</td>
<td>5,000</td>
</tr>
<tr>
<td>Navarro SA</td>
<td>Spain</td>
<td>Black</td>
<td>1,200</td>
</tr>
<tr>
<td>St Gobain</td>
<td>Brazil</td>
<td>Black</td>
<td>2,000</td>
</tr>
<tr>
<td>St Gobain</td>
<td>India</td>
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<tr>
<td>St Gobain</td>
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<td>Pingdingshan</td>
<td>China</td>
<td>Black</td>
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<tr>
<td>Washington</td>
<td>Norway</td>
<td>Black</td>
<td>6,500</td>
</tr>
<tr>
<td>Shima Electric</td>
<td>Japan</td>
<td>Black</td>
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<tr>
<td>Showa Denko</td>
<td>Japan</td>
<td>Black</td>
<td>1,200</td>
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<tr>
<td>TGA</td>
<td>Czech Rep</td>
<td>Black</td>
<td>500</td>
</tr>
<tr>
<td>Volzhsky</td>
<td>Russia</td>
<td>Black</td>
<td>500</td>
</tr>
<tr>
<td>Washington</td>
<td>£UK</td>
<td>Black</td>
<td>300</td>
</tr>
<tr>
<td>Weifang Lihe</td>
<td>China</td>
<td>Black</td>
<td>5,000</td>
</tr>
<tr>
<td>Zaporozhabrasive</td>
<td>Ukraine</td>
<td>Black</td>
<td>600</td>
</tr>
<tr>
<td>Other China</td>
<td>China</td>
<td>Black</td>
<td>43,500</td>
</tr>
<tr>
<td>Other Japan</td>
<td>Japan</td>
<td>Black</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>128,700</strong></td>
</tr>
</tbody>
</table>

Source: SiC & More estimates, company information

World

New SiC plant rumors

Maybe it’s wishful thinking but over recent months SiC & More has received inquiries regarding the building of new SiC furnace plants around the world.

Regardless of new rumors, the potential SiC furnace plant in Canada idea is dead in the water. Planning for this plant ceased and the initial engineering phase that had started in 2007 was terminated in August 2008.

In September rumors circulated about a SiC furnace plant being built in North Korea. SiC & More has talked to several SiC experts around the world and the conclusion is that this is highly unlikely and no confirmation is in sight.

Two other rumors included SiC furnace plants being built in Colombia and Vietnam. Although Colombia appears to be a potentially friendly location, no confirm of such plans has been obtained. With regard to Vietnam, however, it appears as if there is interest in that location albeit project planning is in its infancy.

Keep in mind, there are discussions each and every year regarding the next site for a SiC furnace plant. Recent years have also included Saudi Arabia, Mexico and Iceland as plant locations. However, there are many barriers to entry for starting a SiC plant including environmental, energy, raw materials availability and logistics. Obtaining the necessary environmental permits and negotiating energy contracts with low-enough pricing have been deal killers.

Pet coke

Prices Increasing

Silicon carbide production is SiO2 + 3C - energy - SiC + 2CO. The two key raw materials for producing SiC are silica sand and petroleum coke but while silica sources tend to be stable in regard to supply and price the same is not true for petroleum coke.

In large part, the US has driven the global market for pet coke due to the amount of crude oil refined in order to meet gasoline demand. Since the US economy has been soft for two years, pet coke supply has dropped.
in line with the drop in gasoline demand. At the same time, petcoke demand has not dropped, especially in the export market where the majority of demand comes from Europe and China. The supply situation will improve over the next two years as additional refining capacity comes online as the US economy continues its recovery.

The price of petcoke has been volatile at best. Low sulfur petcoke is currently a rare commodity. Even fuel grade petcoke has increased from a historically typical price of US$10-20 net ton to US$100 net ton.

Depending on the environmental restrictions of the respective country, petcoke for SiC production can run high in sulfur and volatiles. Current pricing for 4-5% sulfur with 15% volatiles is about US$65/net ton FOB NOLA. The price can fluctuate by as much as US$10/net ton either way but has recently been on the high-end, with material selling for US$75/ton. A recent spike saw petcoke quoted as high as US$100/net ton FOB NOLA.

Although the petcoke price appears to be prohibitive in the western hemisphere, the situation in China is worse. “The October price for low sulfur petcoke delivered to a furnace plant in China was in the range of US$290-320/net ton,” a trader told SiC & More.

Another trend for petcoke over the next few years will be quality. US refineries are adding capacity and making process adjustments in order to use heavier crude, and this will yield petcoke in the range of 6-7% sulfur.

The primary petcoke suppliers will continue to be the US and Brazil, however, a slow US economy will put pressure on pet coke supply and prices. Currently, the future is not bright for petcoke consumers.

**BFA**

**BFA update**

Brown-outs of aluminum oxide fusion plants in China’s Henan province continue the adverse affect on brown (BFA) and now white (WFA) fused aluminum oxide supply and pricing.

In May, China’s National Development and Reform Commission, National Energy Administration and State Electricity Regulatory Commission announced that aluminum oxide fusion plants would no longer receive preferential energy prices. In addition, besides the loss of preferential energy prices, policies mandating saving energy and reducing pollution swept through Henan Province.

As a result, the largest BFA producing province in China virtually ceased furnace activity over the last few months. Only a few Denfeng-Henan furnaces continue to operate and management insists they are selling BFA crude at cost.

BFA supply is tight and pricing has increased since we reported US$675-700 n/t delivered NOLA. Pricing for 97%-plus BFA with 1.0% SiO2 is selling in the US$725-760 range delivered NOLA and that is likely to increase again. The good news for BFA processors is that the supply pipeline is currently full.

The bad news continues to fall on the shoulders of end-users. As we reported in SiC & More #36, the price tag shock will be in the end-use market where customers had been buying BFA grain at prices based on 1H10 crude prices. The more expensive crude is now being processed and end-users in virtually all key markets can expect to pay 10-15% more in the fourth quarter than they paid in 1H10.

“Supply is tight and only Denfeng is operating in Henan where production capacity is believed to be about 400,000 metric tpy. If demand increases over the next few months BFA crude prices will increase another 10-15%,” a trader told SiC & More.

The same trader commented, “Regarding white, prices had been somewhat stable but are now expected to experience a 5-10% increase during the last few months of 2010.”

**Other**

**Cumi to expand Foskor**

Indian abrasives/electro minerals producer Carborundum Universal (CUMI) plans to double the size of its Foskor Zirconia business in South Africa, part of its electro minerals group, by early 2012. CUMI intends to produce 4,000 metric tpy of monolythic and bubble zirconia at Foskor Zirconia.

The plant has run at capacity and produces in excess of 400 metric tpm.

CUMI’s electro minerals business unit includes Volzhsky Abrasive, which enjoyed sales growth of 31% in H1 with exports helping the business unit pass on steep cost increases related to electricity and petroleum coke. The Volzhsky facility is operating at full capacity and there is an expansion on the horizon. The first phase 12,000 metric tpy expansion is expected to begin in 2011. In 2008, CUMI entered into an MOU with Volgograd Region Administration to build a 100,000 metric tpy fusion plant at a cost of US$50 million. This was followed by a January 2009 statement that CUMI would begin a 12,000 tpy SiC microgrit expansion at CUMI’s plant in Cochin, India.

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**FREIGHT RATES**

<table>
<thead>
<tr>
<th>Origin</th>
<th>Lot size</th>
<th>Rate/metric ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>10,000 mt</td>
<td>$45-55</td>
</tr>
<tr>
<td>China (North)</td>
<td>Any bulk cargo</td>
<td>$33-38</td>
</tr>
<tr>
<td>China (South)</td>
<td>Any bulk cargo</td>
<td>$37-40</td>
</tr>
<tr>
<td>India</td>
<td>5,000-10,000 mt</td>
<td>$42-48</td>
</tr>
<tr>
<td>Russia</td>
<td>Small bulk 3,000 mt</td>
<td>$70-90</td>
</tr>
<tr>
<td>Russia</td>
<td>Large bulk 20,000 mt</td>
<td>$42-50</td>
</tr>
</tbody>
</table>
### Fused mineral pricing

#### Western Europe SiC - Metric Tons
- 88-92% Metallurgical (EU Producers) €930-1,000
- 88-92% Metallurgical (Russia) €900-975
- 90% Refractory; Typical Sizes €1,000-1,090
- 94-97% Refractory; Typical Sizes €1,150-1,225
- 97% Refractory; Typical Sizes €1,190-1,280
- 97.5% Refractory; Typical Sizes €1,250-1,325
- 98% FEPA F12-F90 €1,200-1,300
- 98% FEPA F100-F220 €1,250-1,350
- 98% FEPA Black F600 €3,200
- 98% FEPA Black F800 €3,300
- 98% FEPA Black F1000 €3,825
- 98% FEPA Black F1200 €4,150
- 98% FEPA Green F8-F220 €1,900-2,175
- 98% FEPA Green F600 €4,525
- 98% FEPA Green F800 €4,950
- 98% FEPA Green F1000 €5,250

#### Middle Europe Alox - Metric Tons
- 8-46 Grit Bonded Abrasive (Ukraine) €660
- 54-220 Grit Bonded Abrasive (Ukraine) €670
- WAO F12-F150 Bonded (Czech & Russia) €950
- WAO F12-F150 Bonded (Hungary) €970
- WAO Refractory, Typical split (Hungary & Russia) €770-800

#### USA SiC & Al2O3 FOB New Orleans - Net Tons
- 90% Metallurgical SiC (China) $1,050-1,125
- 97% Crude SiC (Russia) $1,580-1,625
- 97% Crude SiC (China - Pet Coke) $1,820-1,890
- 97% Crude SiC (China - Anthracite) $1,720-1,790
- Al2O3 Crude (China) bulk (1.5 silica) $680-730
- Al2O3 Crude (bulk) (1.1 silica) $720-770

#### Brown Al2O3 (PNAM) FOB SP - Net Tons
- ANSI 16-70 $935-955
- ANSI 80 $1,010-1,110
- ANSI 90-100 $960-1,110
- ANSI 120, 150, 180 $1,020-1,140
- ANSI 220 $1,060-1,260

#### China SiC & Brown Al2O3: FOB Regions - Metric Tons
- 98% Black F16-100 $1,470-1,520
- 98% Black F36-90 $2,240-2,260
- 98% Black JIS 1,200 Green $4,500-4,700
- 98% Black JIS 1,500 Gren $4,500-4,600
- 98% Black Brown A0 36 >Grit $775-785

#### Miscellaneous products
- Ref Bauxite (China) (3.15) FOB China (m/t) $410-425
- 50% FeSi (USA) (Contained Si) FOB Ware (¢/lb) 105-110
- WFA FOB China port (m/t) $860-915
- DB Mag, FOB China port (m/t) $470-520
- Pig Iron, Steel Quality (g/t) $430-460
- Pig Iron, Nodular (m/t) $575-675
- Fused Magnesite FOB China (m/t) $1,000

Prices ex-works, dry sieve per metric ton, except USA which are net tons, Chinese SiC 52.6% anti-dumping duty in EU. RoC = Run of Crusher. PNAM = Processed North America, SP = Shipping Point. WAO = White Aluminum Oxide. N/A = Not available. Price information has been obtained through contact with sources engaged in the trade of silicon carbide. Actual transaction prices will be determined by a host of factors, including, but not exclusive to, quantity, grades, contract terms and various other factors. Price information sources are deemed to be reliable but due to the possibility of error by Silicon Carbide & More, or others, Silicon Carbide & More does not guarantee the accuracy, adequacy or results obtained from the use of such information. All price information © 2010 by Silicon Carbide & More Inc.