Silicon Carbide & More

What's going on in silicon carbide, fused alumina & other minerals #39 March 2011

Export license policy forces prices higher

By Kormac Kennedy

In late February the World Trade Organization (WTO) issued a preliminary report concluding that China does not have a legal right to impose export restrictions on nine raw materials including silicon carbide. Although the final WTO report should be published in April, it is apparent that China lacks the legal support to continue imposing export controls such as export licenses.

China insists the restrictions are to protect the environment. "The protection of the environment and nonrenewable resources," says the China Institute Deputy Dean Although the WTO allows export controls for environmental reasons, the ruling implies that China uses the measures strictly to increase prices on commodities where it controls the majority of world supply. These include SiC, rare earths and zinc.

What does this mean for the SiC price? China is expected to appeal the ruling to prolong any short term meaningful benefit. However, as China consumes more SiC than any other country and its consumption is increasing year on year, it is possible that a change in export policy would not ensure additional exports anyway. There is also the possibility that, "if China abolishes the export license program for SiC it will just create another mechanism for controlling the price," a trader told ***SiC & More***.

Export licenses purchased for US$35/mt occasionally sell for up to US$350/mt and recently reached US$500/mt, inflating the SiC price. However, the margin on a license sale does not go to a SiC producer but the entity holding the license.

China allocated 216,000 m/t of SiC for export in 2011, the same tonnage as in 2008-2010 and 14,000 m/t less than in 2005. In 2001 the allocation was 270,000 m/t when demand for SiC was much lower than it is today. By the end of the first quarter 2011, 92,000 m/t of licenses had been applied, although this figure does not represent how many tons have actually been shipped, it represents about 43% of 2011's export tonnage. A shortage of export licenses means an increase license cost for a thirsting SiC export market.

"With the dollar weakening against the RMB and the cost of export licenses reaching record price

NEWS

EUROPE

CUMI to break ground in Russia

Carborundum Universal group (CUMI) will break ground on 22 April at the Volzhsky (VAW) SiC furnace plant where it plans to add 12,000 tpy to the existing 55,000 tpy furnace capacity. The expansion is expected to come on stream in Q112.

The expansion comes as CUMI faces the challenge of having sufficient #1 grade SiC feedstock to supply its 12,000 mtpy SiC microgrit expansion in Cochin, India, where it is implementing the final three microgrits modules, the company told ***SiC & More***.

The modules had been postponed due to VAW dedicating SiC to the Russian market rather than export material to Cochin.

CUMI will increase SiC prices in Q2, by about 10%, said managing director, K. Srinivasan, whose comments mirror those of other SiC producers. "SiC manufacturers are not benefiting by this price increase; on the contrary their margins are under pressure from fast increasing input prices; pet coke, energy, inflation, etc".

Although availability is not a problem, Russian energy prices have increased over 15% since the start of the year. The situation is worse in India, however, where prices have

levels, the cost of SiC units will continue to increase and they are already at record levels," another trader commented.

This situation puts importers of lower grade SiC at a huge disadvantage to those buying higher grades like JIS 1200 green that is used for cutting silicon ingot. Not only can an importer better absorb license costs against a higher added value product, but Chinese exporters prefer to export the more expensive powders.

License policy has played a major role in inflating SiC prices. However, SiC producers have made it clear that there are many other price factors at work. "In our case the energy price is 8.5¢ per kWh and it takes 7,300 kWh to produce a ton of SiC. That is US$620 m/t, and you can add US$240 m/t for pet coke and US$72 m/t for sand. Those costs exceed US$900 m/t, which still only represents 65-75% of the overall cost per ton depending on monthly yield," a Western Hemisphere producer said.

In other words, a worldwide increase in energy and raw materials prices means that the current SiC price structure does not look totally out of line. Does this mean that China's export license policy has become an equalizer for the world's SiC furnace plants? One trader says this is exactly what has happened and at the expense of Chinese SiC producers. While middle men in China gobble up the profits from the sale of export licenses, China's producers net less per ton now than before due to energy and raw material price increases.

The WTO ruling is not going to provide short-term relief to those importing SiC from China. Even if China removes its license policy it is likely that growing internal consumption will continue to reduce the tonnage available for export, in which case SiC producers will benefit from the new global price structure.

Prices are likely to increase in Q2 and Q3 and probably throughout 2011 and into Q1 of 2012. Although not nearly as dramatic a change as with rare earths, there is definitely a new global price structure for SiC.

Spain's Navarro Increases prices

Spanish SiC producer Navarro will increase SiC prices in Q2 due to pet coke price increases and with significant energy cost increases on the horizon.

Navarro's SiC furnace plants in Vadillos and Mulas are operating at full capacity, and the company remains in a sold-out position with demand for its P-grits and green SiC products exceeding supply.

Spain continues to struggle to escape its worst recession in 50 years where 20% unemployment levels remain amongst the highest in the EU.

Capital remains hard to come by, which is restricting new growth. Despite such factors, Navarro is weathering the economic storm due to its vision to grow outside its historic marketplace.

SiC price increases show that Navarro faces the same issues that confront all SiC producers today: increasing energy, pet coke and transportation costs.

In addition, Navarro and other EU SiC producers face the possibility that antidumping duties (ADD) against Chinese SiC will expire this year, a trade policy change that could make things very difficult for EU producers while they try to recover from the global economic recession.

Even with ADD's in place against China for nearly 20 years, many EU furnace operations have been forced to close.

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increased and availability is a serious issue. Besides increasing energy costs, CUMI has also experienced significant pet coke price increases, and in addition, supply reliability has been an ongoing issue.

Fortunately, Sriniasan remarked that the Indian economy is strong and the Russian manufacturing sector is improving, and so, "we are at near capacity in all our plants," he said.

CUMI continues with efforts to continuously improve environmental management processes and standards at its operations. "This is the golden jubilee year [50th anniversary] at VAW, and we will take this as an occasion to showcase this, at the plant," Sriniasan said. With the support of the US$2.4 billion/y conglomerate Murugappa Group, CUMI has expanded the production of SiC crude, value added microgrits, zirconia and end-use abrasives, as it positions itself to be one of the world's premier suppliers of materials.

Microgrit update

By Kormac Kennedy

The ***SiC & More*** World SiC Microgrit Capacity chart has been updated to include information received from several new reports.

Washington Mills reported a significant under-reporting in the chart as its plant in Norway. The company says it produces 25,000 n/tpy and not 6,500 n/tpy as previously stated. This change increases the global total from 127,700 to 146,200 t.

However, the most alarming news comes from China where separate discussions with a trader and ceramic engineer indicated that Chinese green powders capacity alone will be 200,000 tons by the end of 2011, far above the 60,000 tpy total Chinese SiC microgrit capacity contained in the chart. China's growth is for photovoltaic applications, cutting silicon ingots into wafers.

This is an astonishing number and one that will take some time to verify. Nevertheless, ***SiC & More*** was informed that Chinese SiC microgrit capacity will grow exponentially this year with two individual 40,000 tpy plants believed to be under construction.

As a result we have adjusted the table by 58,500 tons for Chinese green capacity and it now shows 204,700 tons of capacity. This may still be short of the true total due to the difficulty of obtaining precise information about operations in China. Research efforts continue.

2011 World SiC microgrit capacity estimate (net tons)

Company	Country	Product	Capacity
Alcoa	Brazil		500
Various	China	Green (Misc)	58,500
Various	China	Black	4,000
CUMI	India		6,000
Electro Abrasives	USA		1,200
ESK-SIC	Germany		10,000
Fujimi	Japan		8,000
Micro Abrasivos	Mexico		1,200
Nanko	Japan		5,000
Navarro SA	Spain		1,200
St Gobain	Brazil		2,000
St Gobain	India		1,000
St Gobain	Norway		12,000
Pingdingshan	China		6,000
Washington Mills	Norway		25,000
Shimano Electric	Japan		7,000
Showa Denko	Japan		1,200
Best Holding	Czech Rep		1,000
TGA	Czech Rep		500
Volzhsky	Russia		500
Washington Mills	UK		300
Weifang Liuhe	China		5,000
Zaporozhabrasive	Ukraine		600
Other China	China		43,500
Other Japan	Japan		2,000
Total			**204,700**

Source: SiC & More estimates, company information

Although Navarro has no plans to increase SiC furnace capacity, it continues to expand its processing capabilities within the product lines that deliver most value.

WM signs long-term Norway power deal

SiC producer Washington Mills (WM) and energy company Statkraft have entered into a long-term power agreement that runs through 2018 and comprises a volume of more than 500 GWh. The agreement provides WM with stabile and predicable energy prices from 1 May 2011 until 31 December 2018 for the production facility in Orkdal, Norway.

"This agreement contributes to securing the jobs at the Orkdal plant. This is a good, commercial agreement that ensures predictable and competitive power prices for several years ahead," says Washington Mills managing director Ole Johan Svorkdal.

ZAP sold out

Ukranian SiC producer Zaporozhsky Abrasivny is sold out of SiC and is operating at full capacity.

The 30,000 tpy furnace plant in Zaporozhye is expected to supply at least some of feedstock to the Everfort expansion in Illinois.

AFRICA

Sublime hit by energy price increases

South African SiC producer Sublime will be hit with energy price increases as generator ESKOM will apply a

US foundries face commodity issues

By George O'Malley

The US has been slowly recovering from its worst recession in 50 years and the metals industry that saw capacity utilization drop as low as 30% at the nadir, has been on a slow and tedious recovery since late 2009.

The iron foundry industry, which lost tens of thousands of tons of annual capacity, now finds itself on the brink of total recovery, but that recovery comes with a host of other issues including the supply of critical raw materials, an increasingly acute concern given on-going M&A activity in the sector.

CC Metals and Alloys (CCMA) of Calvert City, Kentucky has been acquired by the Optima Group and some of the owners of Optima are involved in other metal sector companies, specifically Feldman Production, a silicomanganese producer at the old American Alloys plant in New Haven, West Virginia. Also included in the ownership structure is Feldman Trading that will distribute the 40 different foundry alloys produced by CCMA as the New-York based CCMA Trading Division was not included in the sale.

Some experts expect CCMA to cut the number of foundry products it offers from the list of 40 to less than 10. They also believe that the company will eventually become more of a commodity alloy producer, following in the footsteps of Eramet, Globe, Ashland and American Alloys (now Feldman), by switching out of foundry products altogether and into more profitable commodities. This will cause a major supply problem for the US foundry industry as full production rates are being achieved.

US foundries are busy again putting upward pressure on steel scrap, pig iron and alloy prices, rising to their highest levels since mid 2008. Add in the falling US dollar value and US foundries should expect further increases and possible supply interruptions ahead.

The CCMA sale, along with Globe changing its product mix to supply more silicon metal, has consumers concerned about supply. Any hint that supply will be affected by product mix changes at CCMA or ELKEM will boost silicon prices the same way that China supply disruption spiked prices in late 2010.

Silicon carbide (SiC) prices have increased 50-75% since January 2010. The falling US dollar and China's export license policy see industry experts expect SiC price increases to continue through 2011. Since SiC and brown fused aluminum oxide (another commodity whose price is rising) are popular refractory inputs, foundries and steel mills are facing price increases with nearly every order.

Steel scrap prices, which held steady during late 2010 /early 2011, have started to increase. No.2 steel

further 25% increase from 1 April, CEO Geordie Osler told ***SiC & More***. Sublime is operating its 55,000 tpy plant at full capacity including the third transformer unit brought online at the end of 2010.

To put the price increase into perspective, if one assumes that it takes about 7,000 kWh to produce a ton of SiC and that a SiC producer has a world class power rate of 3 to 4¢/kWh, a 25% increase will equate to a US$50 to 70 per net ton cost increase. In addition to energy pricing, Sublime has had to absorb continuous raw material price increases. Such cost issues appear to be common amongst the world's SiC producers, including those in China.

While grappling with the prospect of higher costs, Osler and his team are investigating the costs and strategic advantages of installing a SiC macrogrit plant. Considering that Sublime's new minority partner is Mineracao Curimbaba, this makes a lot of sense. As reported in ***SiC & More*** #37, the participation of Curimbaba provides synergies for both companies and ensures a long-term shareholding between Sublime and the Pheiffer family, which remains the controlling shareholder. In addition to a significant marketing capability in the America's, Curimbaba (the holding company of US fused minerals producer Elfusa) and Elfusa will contribute crushing and screening technology to Sublime.

Sublime continues to focus on supplying local demand,

bushlings are quoted at US$560/nt, and other scrap grades are following this upward trend. Iron ore prices have jumped in anticipation of expected increased demand for rebuilding Japan following its recent earthquake devastation. This has pushed up pig iron prices and they are expected to continue to rise throughout the rest of the year. Ductile pig iron is now selling at over US$600/gt and heading higher. Since the start of the year, nickel and molybdenum have also experienced significant price increases, reversing their previous downward trend.

High carbon ferrochromium is experiencing supply problems and is currently quoted at US$1.30/lb Cr. The US Defense Logistics Agency (DLA) is expected to release some alloy from its stockpile in the near future, which will slow price increases, at least for the near future. The DLA, however, does not have large stockpiles of chromium alloys. Low carbon FeCr prices are about US$2.50/lb Cr but vary with carbon content, and the falling US dollar is increasing chromium prices in dollar terms. High carbon ferromanganese is selling for about US$1,300/gt and its future price again depends on the actions of the USDLA.

Rare earth (RE) prices have risen dramatically and MgFeSi and inoculants containing RE's have risen accordingly. There will be no new supplies of RE's until probably late 2012 or 2013. In the meantime there is a push to use RE free MgFeSi and inoculants.

In short, a recovering US metals industry is struggling to rationalize the growing demand for its products and the seemingly unstoppable price increases of cost inputs. Also to add to this commodity price dilemma are the increasing cost of electricity, natural gas and transportation. Tough times indeed!

which has increased significantly since the global recession, making the commissioning of Furnace Group 3 very timely.

Like virtually every producer of SiC, Sublime will increase prices in Q211 in order to at least keep pace with raw materials, energy and transportation price increases. In addition, Sublime will continue to optimize furnace plant efficiency to keep costs under control and increase SiC yield per kWh.

"Long-term prices need to align with costs and costs have increased significantly," says Osler. Again, a common refrain amongst the world's premier SiC furnace operations. Although end-use markets seemed stunned by the SiC price increases of the last twelve months, to a certain degree such increases are totally justified by the higher cost circumstances.

ASIA

SIC Processing to expand in China

SiC Processing has signed contracts with three Chinese wafer producers for an additional five production lines with a total capacity of 75,000 tpy for recovering and recycling used sawing suspension (slurry) for PV industries. This equates to a total investment of approximately €45 million.

Together with its existing capacity and other plants under construction, these agreements mean SiC Processing will obtain a total capacity of about 400,000 tpy worldwide by Q1/Q2 2012, increasing its global market share to 40%. The new deals strengthen its position as market leader for the recovery and recycling of used sawing suspension.

Through the use of patented technologies for recovering and conditioning SiC the company passes significant cost savings along to its customers, compared to using only new slurry products. SiC Processing recovers 75% to 90% usable SiC and 90% to 95% polyethylene glycol from used slurries. The process corrects the adverse affects of the sawing process to the grain size distribution.

SiC Processing has production sites in Germany, China, Norway, Italy and US.

AMERICAS

Everfort continues US expansion

Mineral processor Everfort Ltd is to expand into the US in 2011 with a new operation in Des Plaines, Illinois. The expansion into the US is expected to include processing for refractory grade material and micro grits for the abrasive industry and technical ceramics.

Everfort works with Ukranian SiC producer Zaporozhsky Abrasivny, which is expected to supply the new plant with some SiC feedstock. Everfort processes and supplies silicon carbide, brown fused aluminum oxide and boron carbide products.

GENERAL

SIC plant rumors

Rumors about new SiC furnace plants or expansions tend to be more wishful thinking than reality. This

FREIGHT RATES

Origin	Lot size	Rate/metric ton	
Brazil	10,000 mt	$45-55	◄
China (North)	Any bulk cargo	$35-39	▲
China (South)	Any bulk cargo	$42-56	▲
India	5,000-10,000 mt	$42-48	◄
Russia	Small bulk 3,000 mt	$70-90	◄
Russia	Large bulk 20,000 mt	$42-50	◄

issues' rumors follow, but please note that SiC & More has been unable to confirm their veracity:

The most active current rumor is for a new plant in Vietnam where many believe ground will be broken before the end of 2011.

Talk was heard of a furnace plant being planned in North Korea and Colombia. No details about the North Korea possibility have been confirmed but it seems a highly unlikely. In Colombia, conditions appear attractive – the amount of rain the country is having means most hydroelectric dams are at full capacity - but it is thought that it does not make the cut for a new furnace plant. Also in South America Paraguay has been mentioned, but no project is likely to be developed during 2011. Several industry experts believe Paraguay represents an excellent location for a new SiC furnace plant.

Saudi Arabia and the Middle East continue to be talked about as potential sites but no plant construction is believed to be underway.

The Canadian venture remains dormant with no planning or engineering having taken place since August 2008 due to pollution control and financing issues. Quebec's comparative advantage was believed to be its long-term agreements for hydro power pricing.

Rumors of potential new SiC projects must be viewed within the context of production expansion at existing facilities. Washington Mills expanded its Hennepin, Illinois plant by about 25% while Sublime increased capacity in South Africa by about one third. CUMI will break ground at Volzhsky in the coming few weeks and new furnace plants are sprouting up in China's northwestern provinces. This new capacity is expected to bring SiC supply into balance with demand as world economies return to pre-recession levels.

There are also many barriers to entry for developing a greenfield SiC plant, which include environmental, energy, raw materials availability and logistics. Obtaining permits and negotiating energy contracts with low-enough energy pricing is easier said than done.

BFA

BFA prices stabilize

Brown fused aluminum oxide (BFA) pricing has stabilized after increasing as much as US$100-150/nt since mid 2010.

BFA prices began increasing in May 2010 when China's National Developmental and Reform Commission, National Energy Administration and State Electricity Regulatory Commission announced that BFA fusion plants would no longer receive preferential energy prices. Subsequent policies mandating energy saving and pollution reduction swept through Henan province in the third quarter 2010 and prices took another jump higher.

However, in February and March 2011, virtually all fusion plants in Henan, Shanxi and Guizhou were back at work and with extra supply hitting the market while demand was flat, BFA pricing looked like it might soften. A weak US dollar and increased energy and transportation costs, meant however that BFA pricing only stabilized.

Prices for large BFA parcels (1,500-6,000 net tons) delivered NOLA are priced virtually the same for April and May shipping as they were for January parcels when material was short. Processors can still expect prices in the US$675-700/nt range delivered NOLA.

"Demand is basically flat and supply is currently running above traditional levels. For the US, in Q3 and Q4 we expect that the only price increases will come from currency exchange. The question is whether or not the US dollar will continue to weaken against the RMB. Overall, we expect BFA pricing to be stable for the rest of the year," a large BFA trader told ***SiC & More***.

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kormackennedy@aol.com

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Fused mineral pricing

Western Europe SiC - Metric Tons	
88-92% Metallurgical (EU Producers)	€1,090-1,225 ▲
88-92% Metallurgical (Russia)	€1,050-1,200 ▲
90% Refractory; Typical Sizes	€1,155-1,260 ▲
94-97% Refractory; Typical Sizes	€1,205-1,310 ▲
97% Refractory; Typical Sizes	€1320-1,404 ▲
97.5% Refractory: Typical Sizes	€1,377-1,458 ▲
98% FEPA F12-F90	€1,337-1,460 ▲
98% FEPA F100-F220	€1,400-1,510 ▲
98% FEPA Black F600	€3,560 ▲
98% FEPA Black F800	€3,580 ▲
98% FEPA Black F1000	€4,145 ▲
98% FEPA Black F1200	€4,355 ▲
98% FEPA Green F8-F220	€1,900-2,175 ◀
98% FEPA Green F600	€4,755 ▲
98% FEPA Green F800	€5,290 ▲
98% FEPA Green F1000	€5,615 ▲

Middle Europe SiC - Metric Tons	
88-92% Metallurgical (Russia)	€1,050-1,150 ▲
88-92% Metallurgical (Romania)	€1,025-1,150 ▲
98% FEPA F12-F90	€1,300-1,360 ▲
98% FEPA F100-F220	€1,335-1,390 ▲
97% Refractory, Typical Splits (Czech)	€1,240-1,350 ▲
98% Black 320 (Czech)	€1,700 ▲
98% Black 500 & 600 (Czech)	€2,200-2,450 ▲
97% Black 800, 1,000 & 1,200 (Czech)	€2,450-2,640 ▲

USA Other SiC - Net Tons	
97% Refractory, Hi Fe (China)	$1,900 ▲
97% Refractory, Low Fe (China)	$2,000 ▲
97% ANSI 16-60 Grit (PNAM) (FOB SP)	$2,000-2,200 ▲
97% ANSI 80-220 Grit (PNAM) (FOB SP)	$2,200-2,300 ▲
98% Black F500 & F600	$4,100-4,400 ▲
97% 16-70 (Russia)	$1,425-1,500 N/A
97% 70-150 (Russia)	$1,800-1,900 ▲
97% 180 & 220 (Russia)	$1,800-1,900 ▲

Fused Magnesite FOB China Port – Metric Tons	
97.5%	$990-1,010 ▲
97.3%	$910-920 ◀
97.0%	$870-890 ◀
96.6%	$830-840 ◀
96.0%	$770-790 ◀

Middle Europe Alox - Metric Tons	
8-46 Grit Bonded Abrasive (Ukraine)	€820 ▲
54-220 Grit Bonded Abrasive (Ukraine)	€890 ▲
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)	$1,375-1,425 ▲
97% Crude SiC Refractory (Russia)	$1,790-1,850 ▲
97% Crude SiC (China - Pet Coke)	N/A
97% Crude SiC (China - Anthracite)	$1,600-1,675 ▲
Al2O3 Crude (China) bulk (1.5 silica)	$710-730 ◀
Al2O3 Crude (China) bulk (1.1 silica)	$720-780 ◀

US Brown Al2O3 (PNAM) FOB SP - Net Tons	
ANSI 16-70	$980-1,000 ◀
ANSI 80	$1,030-1,150 ◀
ANSI 90-100	$1,000-1,150 ▲
ANSI 120, 150, 180	$1,080-1,160 ▲
ANSI 220	$1,100-1,300 ◀

China SiC & Brown Al2O3: FOB Regions – Metric Tons	
98% Black F16-100	$1,650-1,750 ▲
98% Green F36-120	$2,590-2,650 ▲
98% Green F280 & F320	$3,550 ▲
98% Green JIS 1,000	$4,400-4,500 ▲
98% Green JIS 1,200	$5,150-5,250 ▲
98% Green JIS 1,500	$5,150-5,250 ▲
98% Green JIS 2,000	$4,750 ▲
98% Brown AO 36 Grit	$800-840 ◀

Miscellaneous products	
Ref Bauxite (China) (3.15) FOB China (m/t)	$400-450 ◀
50% FeSi (USA) (Contained Si) FOB Ware (¢/lb)	1.10-1.20 ▲
WFA FOB China port (m/t)	$910-920 ◀
Pig Iron, Steel Quality (g/t)	$510-540 ◀
Pig Iron, Nodular (m/t)	$610-700 ◀
Hi carbon FeCr (lb Cr) FOB Ware (¢/lb)	1.35-1.40 NEW
FeP, FOB Ware (¢/lb)	27-30 NEW
FeMo, FOB Ware (¢/lb)	18-25 NEW

Dead Burned Magnesite Briquette– Metric Tons	
97.5%	$630-640 ◀
97.0%	$590-620 ◀

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 © 2011 by Silicon Carbide & More Inc.