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Mineral Industry Surveys

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MAGNESIUM IN THE FIRST QUARTER 2011

U.S. magnesium exports for the first quarter of 2011 were 37% lower than exports in the first quarter of 2010. Exports of alloys decreased by more than 50%. Magnesium imports for consumption through March 2011 were 4% higher than those in the same period of 2010. Israel (82%) was the principal source of imported magnesium metal. China (34%), Israel (25%), and Japan (12%) were the main sources of alloy imports.

Quoted magnesium prices for the first quarter of 2011 are shown in table 2. U.S. magnesium prices increased in the first quarter mainly because of a strengthening aluminum market.

U.S. Magnesium LLC accelerated its expansion plans and expected to have most of the 11,500-metric-ton-per-year (t/yr) expansion at its Rowley, UT, primary magnesium plant onstream by the end of 2011. The expansion was originally scheduled to be completed by yearend 2012, but the company cited an increase in orders as the reason for the accelerated startup. When the expansion is complete, the company's total production capacity would be 63,500 t/yr (McBeth, 2011b).

U.S. Magnesium also appealed the U.S. International Trade Commission's (ITC) decision to revoke antidumping duties on imports of magnesium from Russia. U.S. Magnesium filed a formal complaint with the U.S. Court of International Trade in April. The formal complaint alleged that the ITC should have cumulated imports of Russian and Chinese magnesium before making a ruling instead of looking at each country's imports separately. U.S. Magnesium also contended that the ITC's decision that revocation of the duties would not lead to increases in imports was erroneous (Riley, 2011).

Phoenix Global Enterprises LLC (PGE) opened a new magnesium scrap recycling plant in Anderson, IN, to process magnesium solids from turnings. The new plant is adjacent to Advanced Magnesium Alloys Corp.'s (Amacor) magnesium recycling facility and is majority owned by the same individual. The new plant was expected to be able to take machining turnings, which are considered hazardous material because of their size, and convert them into 3-pound cylinders containing 90% to 94% magnesium to be sold to the secondary aluminum industry. Normally diecasting companies pay to have the magnesium metal slivers removed because they are difficult to recycle, but Amacor developed a proprietary process that enabled the turnings to be economically recycled. PGE reportedly was selling the ingots for $1.50 per pound, less than 90/10 secondary magnesium ingot, which was selling for $1.80 to $1.90 per pound (McBeth, 2011a).

ESM Group Inc. (a subsidiary of SKW Stahl-Metallurgie Holding AG, Unterneukirchen, Germany) opened a new atomized magnesium metal powder facility at its plant in Saxonburg, PA, in March. The new plant will produce fine and ultrafine spherical magnesium powder, used for military countermeasures (flares) that are used to protect aircraft from missiles. Production was scheduled to begin in the middle of 2011, and test shipments to customers would begin early in the third quarter of 2011 (Metal Powder Report.net, 2011).

In China, several firms continued to expand their primary magnesium metal production capacities. China Magnesium Corp. Ltd. (Southport, Queensland, Australia) was on schedule to complete the expansion of its magnesium plant at Pingyao, Shanxi Province, to 20,000 t/yr from 5,000 t/yr by December 2011 (Platts Metals Week, 2011). The company began producing magnesium from the refurbished 5,000-t/yr plant in April. The plant had been idle since 2008. Xinjiang Hongxing Kejian Magnesium Co., Ltd. brought a 20,000-t/yr magnesium plant onstream in early 2011 in the Xinjiang Uygur Autonomous Region and planned to increase production capacity to 100,000 t/yr within 3 years (Metal-Pages, 2011b).

South Korean steel producer Pohang Iron and Steel Co. (POSCO) announced that it would begin construction of a 10,000-t/yr primary magnesium plant in Gangneung City, Gangwon Province, Republic of Korea, in May. Construction of the modified Pidgeon process plant was expected to be completed by June 2012, with further expansion to 20,000 t/yr by 2016 and 100,000 t/yr by 2018. POSCO had been producing magnesium strip from magnesium imported from China. By constructing a primary metal plant that would use dolomite byproduct from cement production, POSCO would not be dependent upon China for its raw material. The company also planned to expand its magnesium business to other areas such as for diecast components for the South Korean auto industry (Metal-Pages, 2011a).

nanoMAG, LLC (Ann Arbor, MI) was awarded funding from the National Science Foundation (NSF) and the U.S Department of the Army to develop new applications for its magnesium sheet. A $730,000 contract extension with the Army was expected to focus on development of lightweight composite armor for armored vehicles and ballistics applications, and a $100,000 NSF grant would support research on resorbable biomedical implants for orthopedic applications. nanoMAG claims that magnesium sheet produced by its patent-pending process provides 200% higher strength and improved toughness over conventional magnesium, while also providing the strength of carbon steel sheet at one-fourth the weight (nanoMAG LLC, 2011).

McPhy Energy (La Motte-Fanjas, France), created in 2008 to industrialize and commercialize solid hydrogen storage technology using magnesium hydride, signed a contract with the Enel Group, Italy's leading power company and Europe's second leading utility by installed capacity, to supply a 2-kilogram (kg) solid hydrogen storage system, stored in the form of magnesium hydrides. The company also signed a contract with Iwatani Corp., Japan's leading supplier of hydrogen in terms of market share, to supply a 4-kg solid hydrogen storage solution. Historically, hydrogen storage methods have been based on compression and liquefaction (direct storage), which involve safety problems and costs for compression and cooling. McPhy's systems initially were marketed to the merchant hydrogen market, but are now being used for the renewable energy industry (McPhy Energy, 2011a, b).

References Cited

McBeth, Karen, 2011a, Amacor owners start new magnesium turnings recycling plant: Platts Metals Week, v. 82, no. 14, April 4, p. 1, 11–12.

McBeth, Karen, 2011b, U.S. Magnesium accelerates expansion, expects output mid-year: Platts Metals Week, v. 82, no. 15, April 11, p. 14–15.

McPhy Energy, 2011a, McPhy Energy signs contract with Enel Group for solid hydrogen storage: Grenoble, France, McPhy Energy news release, February 7, 2 p.

McPhy Energy, 2011b, McPhy Energy to supply solid hydrogen storage solution to Iwatani Corporation, Japan's market leader: Tokyo, Japan, McPhy Energy news release, March 2, 2 p.

Metal-Pages, 2011a, POSCO plans to become world's biggest magnesium smelting company–IMA: Metal-Pages, May 10. (Accessed May 11, 2011, via http://www.metal-pages.com/.)

Metal-Pages, 2011b, Xinjiang Hongxing Kejian to expand magnesium capacity to 100,000 tpy: Metal-Pages, May 13. (Accessed May 13, 2011, via http://www.metal-pages.com/.)

Metal Powder Report.net, 2011, ESM SMT opens magnesium powder plant: Metal Powder Report.net, March 4. (Accessed March 7, 2011, at http://www.metal-powder.net/view/16374/esm-smt-opens-magnesium-powder-plant/.)

nanoMAG, LLC, 2011, nanoMAG LLC wins new funding for development of lightweight, high-strength magnesium sheet: Ann Arbor, MI, nanoMAG, LLC press release, February 8. (Accessed March 4, 2011, at http://www.nanomag.us/about-nanoMAG/press-releases/nanomag-llc-wins-new-funding-for-development-of-lightweight-high-strength-magnesium-sheet.)

Platts Metals Week, 2011, China Magnesium's Shanxi plant expands: Platts Metals Week, v. 82, no. 16, April 18, p. 3.

Riley, Anne, 2011, US Mag files formal appeal of ITC's Russian import ruling: American Metal Market, April 25. (Accessed May 10, 2011, via http://www.amm.com.)

TABLE 1

U.S. IMPORTS FOR CONSUMPTION AND EXPORTS OF MAGNESIUM[1]

(Metric tons)

		2011			
	2010	January	February	March	January-March
Imports for consumption:					
Metal	18,200	1,260	1,030	1,010	3,300
Waste and scrap	22,100	1,760	1,750	1,980	5,490
Alloys (magnesium content)	11,600	740	840	1,010	2,590
Sheet, tubing, ribbons, wire, powder, and other (magnesium content)	788	42	64	92	197
Total	52,700	3,800	3,680	4,080	11,600
Exports:					
Metal	5,300	367	380	594	1,340
Waste and scrap	481	45	23	88	157
Alloys (gross weight)	6,940	418	345	504	1,270
Sheet, tubing, ribbons, wire, powder, and other (gross weight)	2,070	130	116	139	385
Total	14,800	961	865	1,330	3,150

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

Source: U.S. Census Bureau.

TABLE 2

MAGNESIUM PRICES, FIRST QUARTER 2011

		Beginning of quarter	End of quarter
U.S. spot dealer import	dollars per pound	2.25-2.40	2.30-2.45
U.S. spot Western	do.	2.35-2.50	2.50-2.60
China	dollars per metric ton	2,900-2,950	3,080-3,120
European free market	do.	2,950-3,050	3,150-3,250

do. Ditto.

Source: Platts Metals Week.