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Headline

In 2014, the smelter acid industry in China will have a bright prospect, with the development of nonferrous metal industry and the recovery of chemical fertilizers at home and abroad.

New reserves of phosphorus ore amounting to 52.85 million tonnes have been discovered in Mabian County, Sichuan Province. This figure corresponds to 39.1% of the province's new reserves.

In Apr. 2014, the SSP market in China remained sluggish, even though farmers across the country began spring ploughing.

In 2013, YTH suffered great losses from the main businesses, since it adopted two large asset reorganizations in 2013.

It is expected that the Report on Environmental Influences Caused by Phosphoric Acid Purification Equipment Reconstruction Project in Sinochem Yunlong Co., Ltd. will pass verification in Apr. 2014, indicating that Sinochem Group will again carry out technical transformation and upgrading in the phosphorus chemical industry.

The application of dry dedusting technology can remove 90% dust in electric arc furnace. As a result, the content of phosphorus slurry in yellow phosphorus will decline from 10%-15% to 1%.

With distinguishing characteristics, black phosphorus two-dimensional crystals open up bright prospects.

In Feb. 2014, the exports of MAP and DAP in China soared. It is predicted that the exports of phosphate fertilizers will maintain stable with small increases in H1 2014.

In Q1 2014, the price of yellow phosphorus in China witnessed an obvious increase. It is predicted to maintain stable in Q2 2014.
Editor's Note

In Mar. 2014, the price of phosphorus ore continued to increase slightly. Along with the price increases in electricity in low-flow period, the yellow phosphorus enterprises lowered their operating rates to about 20%, causing a short-term tight supply and increasing price. However, with the coming of high-flow period, the enterprises will put back on production. Furthermore, the sufficient and even excess supply will hold back the price increases in Q2 2014. Regarding the phosphate fertilizer industry, since the spring ploughing comes to an end, the fertilizer producers will turn to exports. Also, the price of downstream phosphorus fine chemicals maintained stable in Mar. 2014.

In Q1 2014, the provinces released the phosphorus ore discovered last year in their mining areas. Accordingly, CCM had an in-depth analysis on the situation of phosphorus ore discovered in Mabian County, Sichuan Province. It is announced that the new reserves in Sichuan Province added up to 135 million tonnes in 2013. Among the areas prospected was Liugushui, a major mining area in Mabian County, Leshan City, where reserves of 52.85 million tonnes (39.1% of all new reserves) were found. The area's average grade is 23.67% (P₂O₅). Abundant phosphorus ore, sufficient power resources and abundant high-quality coal fully underpin the development of phosphorus chemicals in Mabian County. Mabian County has been experiencing great economic development. The discovery of new phosphorus ore reserves will enhance the impact of phosphorus chemicals on the local economy, opening up great opportunities for Mabian County and local phosphorus chemical enterprises.

The RMB/USD exchange rate in this issue is USD1.00=RMB6.1503 on 1 Apr., 2014, sourced from the People's Bank of China.
Market Dynamics

**China’s smelter acid industry has bright prospect in 2014**

Summary: In 2014, the smelter acid industry in China will have a bright prospect, with the development of nonferrous metal industry and the recovery of chemical fertilizers at home and abroad.

In the past ten years, with the development of nonferrous metal industry, the gas-based acid preparation (product namely smelter acid) has been witnessing a rapid increase in output. According to statistics, the output of smelter acid reached 24.70 million tonnes in 2013, up by 5.0% over 2012. It accounted for 29.0% of the total output of sulfuric acid in 2013.

In China, the smelter acid industry is usually distributed in nonferrous metal mining areas. In recent two years, however, it began to move to coastal areas. Currently, it is concentratedly located in Anhui, Yunnan, Gansu, Shandong, Henan, Jiangxi and Inner Mongolia provinces, each producing over 2 million tonnes of smelter acid per year. Specially, Anhui Province boasts an output of nearly 3 million tonnes annually. The total output of the above seven provinces accounts for 70.9% of the total nationwide. In 2013, there were over 130 smelter acid manufacturers in China. Of this, 28 enterprises owned a capacity of over 200,000 t/a, whose output totaled 18.77 million tonnes in 2013, accounting for 76.0% of the total smelter acid in China. Specially, the output of first ten enterprises reached 13.49 million tonnes with a YoY increase of 10.0%, accounting for 54.6% of the total domestic smelter acid.

The downstream consumption of sulfuric acid in China is mainly divided into two parts.

-Self-consumption acid matching chemical and fertilizer industries. According to data in 2013, the sulfuric acid produced by chemical fertilizer manufacturers totaled 40.88 million tonnes, accounting for 48.0% of the total output. Of this, 3.6% was smelter acid. In 2013, the amount of sulfuric acid used in phosphate fertilizers accounted for 65.0% of the total consumption. In 2014, since the export tax is reduced by the Chinese government, the fertilizers are expected to be exported. At the same time, as the fertilizer inventory in India is relatively low, it may purchase in a large amount in May 2014. Moreover, with the stocking activity in winter and the coming of spring ploughing, the sulfuric acid industry in 2014 will encounter a promising start.

-Commodity acid. According to statistics, the amount of commercial sulfuric acid in domestic market totaled 25.55 million tonnes in 2013, accounting for 30.0% of the total output, of which 90.5% was smelter acid. There was about 10 million tonnes of smelter acid directly supplied to fertilizer enterprises.
Currently, smelter acid industry is witnessing a rapid development, since it presents the following two advantages.

- Environmental protection. Smelter acid based on recycling gas is an eco-friendly product, compared with sulfur-based acid. Also, it reduces China's dependence on sulfur imports, which will contribute to the emerging of nonferrous metal and the sustainable development of sulfuric acid industry. The increasing smelter acid will enforce manufacturers to reduce or suspend part of the production of sulfuric acid. In 2013, the operating rate of sulfur-based preparation equipment was lowered obviously. Meanwhile, the capacity of smelter acid accounted for 29.6% of that of sulfuric acid. However, the newly-added capacity of smelter acid in 2014-2015 will reach 5.10 million t/a, and in the 12th Five-year Plan (2011-2015), it will increase by over 13 million t/a. Therefore, smelter acid will claim much more shares in sulfuric acid market.

- Raw material. In the 12th Five-year Plan, the development of nonferrous metal industry drives up the development of smelter acid industry. The sulfur recycled from nonferrous metal like copper, cadmium and zinc is increasing, along with the increasing recycling rate of nonferrous smelter sulfur. Thus, the output of smelter acid is witnessing a rapid development. In the past three years, smelter acid has witnessed a double-digit growth in output. In China, gas for acid preparation mainly comes from heavy metal (97%). Of this, the output of smelter acid from nickel and copper ranks the most. In detail, the output of smelter acid from refined copper...
toted 6.84 million tonnes in 2013, with a YoY increase of 13.6%. Besides, the supply of refined copper begins to increase from 2014. Therefore, it is predicted that China will increase the imports of refined copper and quicken the development of smelter acid industry, especially the copper-based one.

**New phosphorus ore reserves of 52.85 million tonnes discovered in Sichuan’s Mabian County**

**Summary:** New reserves of phosphorus ore amounting to 52.85 million tonnes have been discovered in Mabian County, Sichuan Province. This figure corresponds to 39.1% of the province’s new reserves.

On 24 Mar., 2014, authorities in Sichuan Province, one of the four largest phosphorus ore producers in China, announced that new reserves, adding up to 135 million tonnes, were discovered in 2013. Last year, the province invested USD16.12 million (RMB99.15 million) to implement 24 phosphorus ore exploration projects. Among the areas prospected was Liugushui, a major mining area in Mabian Yi Autonomous County (Mabian County), Leshan City, where reserves of 52.85 million tonnes (39.1% of all new reserves) were found. The area’s average grade is 23.67% (P$_2$O$_5$).

Mabian County, in southwestern Sichuan, is a mining area with abundant phosphorus ore. Its phosphorus ore presents advantages such as stable reserves, high grade, few impurities, and easy exploitation, ensuring sufficient resources for the development of phosphorus chemicals. Mabian County's main advantages are as follows:

- **Abundant phosphorus ore.** The county's four mining areas, Yin'gou, Dayuanzi, Laoheba and Liugushui, have added reserves of 2.48 billion tonnes, and put Mabian County in fourth place among the largest mining areas in China. The county's phosphorus ore grade is 24% (P$_2$O$_5$) on average and 39% at its highest. Moreover, the average thickness of ore beds exceeds ten meters, allowing for the phosphorus ore to be processed into various chemical products through either thermal or wet process.

- **Sufficient power resources.** Theoretically, the electricity generated from four main water courses (Gaozhuoying River, Wahei River, Xianjiapu River and Mabian River) can reach 656,400 kW. Currently, 30 power stations are operational, providing a capacity of 266,800 kW, while transmission and transformation lines from Laodong Village to Muchuan County have a capacity of 110 kVA.

- **Abundant high-quality coal.** Anthracite is the main variety of coal in Mabian County, with reserves of over 100 million tonnes and heat content of 5,500-6,000 kcal/kg. It can replace coke in the production of yellow phosphorus at a lower cost.

The three resources above fully underpin the development of phosphorus chemicals in Mabian County: abundant phosphorus ore lay a solid foundation, sufficient power resources ensure the energy supply and qualified coal resources create auxiliary conditions.

Industry is one of four fronts of economic growth in Mabian County, and the annual gross output value from phosphorus chemicals in particular accounts for 30% of the county's total gross industrial output value. The discovery of new phosphorus ore reserves will enhance the impact of phosphorus chemicals on the local economy, opening up great opportunities for Mabian County and local phosphorus chemical enterprises.

First of all, more phosphorus ore means greater cost advantages, and fosters the establishment of more phosphorus chemical plants. For instance, Sichuan Chemical Industry Holding (Group) Co., Ltd. invested USD487.78 million (RMB3 billion) in a facility for phosphorus ore extraction and selection, and for the purification of phosphoric acid; Sichuan Hebang Co., Ltd. invested
USD325.19 million (RMB2 billion) in a project for the exploitation and utilization of phosphorus ore in the production of phosphorus fine chemicals. The region will also be able to attract foreign funds for further development.

Additionally, as one of five industrial clusters developed by Leshan City, Mabian County's phosphorus chemical industry is fully supported by the local government. Incentives include preferential policies, such as the Land Use Policy for Phosphorus Chemical Enterprises and the Taxation Policy for Phosphorus Chemical Development. As a minority county supported and developed by the Chinese government, Mabian County will also receive financial, fiscal, land and electricity incentives, further stimulating the development of the local phosphorus chemical industry.

Finally, given that phosphorus ore is a non-renewable resource, its value increases as its availability decreases. Limited by natural and energetic resources, the phosphorus chemical industry tends to settle in places where phosphate and electricity are as readily available as possible, which will be yet another advantage for Mabian County and the local phosphorus chemical enterprises.

With abundant resources and preferential policies on its side, Mabian County has been experiencing great economic development. However, the healthy development of the phosphorus chemical industry calls for joint efforts from the local government and enterprises.

The government should:

- Set the plans for industrial development to a timeline, actively promoting the integration of phosphorus ore, electricity and phosphate. Special industrial clusters should be established at a quicker pace, in order to enhance industrial concentration. Plants so gathered in clusters will produce intensively, and comprehensively develop phosphorus fine chemicals.

- Accelerate infrastructure works, particularly power stations, to provide sufficient electricity for the high energy-consuming phosphorus chemical industry, as well as carry out basic construction in mining areas.

- Adjust phosphorus ore taxes and moderately limit exploitation volumes of high-grade phosphorus ore, emphasizing thorough beneficiation, in order to ensure sufficient raw materials for the development of the phosphorus chemical industry.

Enterprises should:

- Invest in innovation. Local enterprises may strengthen cooperation with R&D institutes by establishing technological R&D centers, in order to accelerate the development and production of phosphorus fine chemical products and extend the industrial chain to end products.

- Promote a comprehensive utilization of phosphorus ore. Enterprises should apply technologies such as reserve flotation (which separate high-grade phosphorus ore by scrubbing and desliming tailings and medium- and low-grade ore) and balling and sintering of ore fines to improve utilization rates. Above all, multi-electrode furnaces should also be used in order to save energy.

- Improve environmental awareness and sustainably develop its activities. Companies should introduce advanced processes at home and abroad and upgrade current technologies. Dust and water recycling technologies can also be applied towards the goal of zero emission. Additionally, they can recycle tail gas for power generation, phosphate slag for cement production, and phosphogypsum and yellow phosphorus slag for manufacturing construction materials.
Chinese SSP market remains sluggish in spring 2014

Summary: In Apr. 2014, the SSP market in China remained sluggish, even though farmers across the country began spring ploughing.

In early Apr. 2014, many calcium superphosphate (SSP) manufacturers have resumed production. Ex-works prices of SSP 12% powder and SSP 12% particle reached USD73.17/t (RMB450/t) and USD86.17/t (RMB530/t), up by USD8.13/t (RMB50/t) and USD4.88/t (RMB30/t) respectively, from late Mar. 2014. The market is certainly tamer when compared to the same period in 2013. Most SSP manufacturers put off recommencing production for half a month, and average ex-works prices are down by USD3.25/t (RMB20/t) from early Apr. 2013. Distributors are reportedly not optimistic towards domestic SSP, and predict low activity and a continuously shrinking market for the near future.

The stagnation in the Chinese SSP market in 2014 is mainly attributed to insufficient raw materials.

Phosphorus ore - Production: Sichuan, Hubei, Yunnan and Guizhou provinces, important producers of phosphorus ore, are currently confronted with strict inspections on mines and procedures, holding back mining.

- Demand: downstream demand for phosphorus ore is weakening, and phosphorus ore producers are still filling previous orders.

Sulfuric acid - Price: as sulfur prices are on a downturn, sulfuric acid prices also drop, leading manufacturers to lower operating rates. - Environmental protection: at the moment, many sulfuric acid producers must suspend production in order to conduct adjustments and reduce emissions harmful to the environment. Furthermore, the Chinese government is accelerating the process of limiting the operation of high energy-consumption enterprises. Consequently, many small nitrogen fertilizer plants are being forced to stop production, directly impacting SSP's tie-in sales model. Cost increases in electricity and transportation have also pulled up production costs and cut down profits for SSP manufacturers. Finally, high-concentration phosphate fertilizers and composite fertilizers are undercutting downstream demand for SSP and deepening the market's stagnation.

In recent years, high-concentration phosphate fertilizers and composite fertilizers have been widely promoted. Given the fact that SSP is an unsophisticated and comparatively inefficient product, its market was affected by these new competitors. Certain factors, however, will help SSP maintain its position in the fertilizer industry:

Firstly, SSP is a nitrogen-phosphate-potassium (NPK) composite fertilizer with a 30%-40% nutrient content, and it can provide P2O5 (12%-18%), sulfur (10%-13%) and calcium oxide (18%-23%). Unlike nitrogen fertilizers, it does not pollute the environment even at large amounts. Furthermore, its nutrients can be stored in the soil for grain absorption.

Secondly, medium-grade phosphorus ore can be used as the raw material for the production of SSP. Compared with other ammonium phosphate fertilizers, producing SSP allows for a more rational utilization of phosphorus ore and reduces the output of phosphogypsum.

Finally, Chinese farmers often favor low-priced SSP over more costly high-concentration and composite fertilizers.

Regarding the development of the Chinese SSP market, CCM has the following suggestions for manufacturers:

First of all, Chinese producers can develop deep-processing SSP products. Manufacturers can develop new phosphate fertilizers by replacing sulfuric acid with urea sulfate as the phosphate solubilizing agent, directly producing phosphorus-enriched composite fertilizers.
fertilizers with adjustable nutrients. No matter the process (wet or thermal) chosen for production, medium- and low-grade phosphorus ore may be employed, and phosphorus ore or tailings with 15% \( \text{P}_2\text{O}_5 \) may be used in the thermal process.

In addition, enterprises should ensure product quality in a long-term effort to build good brand reputation. In China, it is not uncommon for manufacturers to use inferior materials and turn out substandard products in order to increase profits, further lowering the quality of the already low added-value SSP. We suggest that producers add enzymes or peptides to SSP in order to improve the product and establish better reputation for themselves in the industry.

**North Korea imports large quantities of chemical fertilizers from China in Jan.-Feb. 2014**

Since Jan. 2014, North Korea has imported large quantities of chemical fertilizers from China with a sharp increase. On 28 Mar., 2014, Korea International Trade Association published statistics revealing that North Korea imported chemical fertilizers from China with a quantity of 49,000 tonnes in the first two months of 2014, 46 times larger than that in Jan.-Feb. 2013. Of this, the imports of diammonium phosphate (DAP) reached 5,010 tonnes, accounting for 10.20% of the total chemical fertilizer imports from China. It is worth noting that North Korea did not import chemical fertilizers from China in previous Jan.-Feb. Generally speaking, North Korea begins the imports from China in Mar. and witnesses sharp increases in Apr.-June (farming period).

Chairman Jin Zheng'en pointed out in his New Year speech that North Korea would focus on agriculture to develop national economy and improve people's lives. The large chemical fertilizer imports from China indicates that North Korea is emphasizing the importance of agricultural production with scheduled plans. It is expected that the grain outputs in North Korea will increase in the near future.

**Company Dynamics**

**YTH suffers huge loss of USD237.87 million in net profit in 2013**

Summary: In 2013, YTH suffered great losses from the main businesses, since it adopted two large asset reorganizations in 2013.

On 31 Mar., 2014, Yunnan Yuntianhua Co., Ltd. (YTH) released the 2013 financial report, disclosing that YTH's revenue in 2013 totaled USD9.09 billion (RMB55.90 billion), down by 4.8% over 2012. Of this, its net profit decreased to -USD237.87 million (-RMB1.46 billion), USD149.26 million (RMB918 million) lower than that of -USD88.67 million (-RMB545.32 million) in 2012. For instance, a subsidiary namely Yunnan Yuntianhua International Chemical Co., Ltd. (YTHIC) involved in phosphate fertilizer business suffered a loss of USD117.64 million (RMB723.52 million). YTH summarized in the announcement about the losses of its listed phosphate fertilizer companies, and attributed its losses mainly to the price decreases of phosphate fertilizers. It is revealed that the leading phosphate fertilizers in China, such as Hubei Xingfa Chemicals Group Co., Ltd., Liuguo Chemical Industry Co., Ltd. and Hubei Yihua Chemical Industry Co., Ltd. all suffered losses of 60%-100% in net profits in 2013.

According to YTH's financial report, the net profit from the underlying assets in the reorganization of mining business and fertilizers in Apr. 2013 declined to -USD112.19 million (-RMB690 million), of which the net profit from mining business reached about USD66.01 million (RMB406 million), indicating that the net profit from fertilizers suffered a loss of USD178.85 million (RMB1.10 billion). However, the moment the two businesses were reorganized, they were expected to achieve a net profit of USD165.85...
Regarding YTH's huge losses in 2013, most investors and media considered its two asset reorganizations in 2013 as the main reasons.

-In Apr. 2013, YTH acquired the two businesses valued at USD2.24 billion (RMB13.79 billion) from its large shareholder YTHIC, covering phosphorus ore and phosphate fertilizers. Commonly the investors attributed the losses mainly to the injected fertilizer business which suffered from great losses in 2013.

-In Nov. 2013, YTHIC acquired the glass fiber business from YTH by giving its holding shares of YTH as a consideration, to achieve the divestiture. It is worth mentioning that the glass fiber industry encountered serious overcapacity with very weak demand in 2013.

After two asset reorganizations, YTH announced that it has become the first largest phosphate composite fertilizer producer in Asia and the second largest in the world. YTH positioned itself as a comprehensive fertilizer producer equipped with upstream resource advantages, aiming to extend the business to phosphorus ore. Moreover, it hoped to gain profits from the injected assets and businesses. However, the great loss of USD237.87 million (RMB1.46 billion) played an ironic joke to YTH. It seemed that YTH tried to induce the weak-willed retail investors to sell their holding shares at low prices, with the sluggish phosphate fertilizer market as a cover. Hence YTH could gain more profits when the share prices went to bottom fishing.

Regarding the long-term development, the phosphorus ore business injected into listed enterprise will benefit the listed enterprise. However, affected by the sluggish phosphate fertilizer market, it cannot achieve the benefit in a short term. It is disclosed in the financial report that gross profit margin from phosphorus ore business still stayed at a high position of 25.63% in 2013, up from monoammonium phosphate (4.66%) and diammonium phosphate (11.32%). It is predicted that the phosphate fertilizer industry will maintain a weak market in the following three to five years, due to the double capacity expansions in China and the world. Only when the export tariff policy for phosphate fertilizers is adjusted qualitatively, for example, the implementation of yearly uniform tariff, can it witness some development. Yet, YTH also holds a negative attitude towards the phosphate fertilizer industry in 2014. Though it has acquired some phosphate fertilizer capacities, it is targeted to only achieve an output of 5.01 million tonnes in 2014, down from 5.14 million tonnes in 2013.

**Sinochem Group to again carry out technical transformation and upgrading in phosphorus chemical industry**

Summary: It is expected that the Report on Environmental Influences Caused by Phosphoric Acid Purification Equipment Reconstruction Project in Sinochem Yunlong Co., Ltd. will pass verification in Apr. 2014, indicating that Sinochem Group will again carry out technical transformation and upgrading in the phosphorus chemical industry.

In late Mar. 2014, Kunming Environmental Protection Bureau published the basic information of the to-be-approved Report on Environmental Influences Caused by Phosphoric Acid Purification Equipment Reconstruction Project in Sinochem Yunlong Co., Ltd. Sinochem Yunlong Co., Ltd. (Sinochem Yunlong) is the only feed-grade phosphate production base in China for Sinochem Group, with a phosphorus ore flotation device (1 million t/a) and three production lines covering the production of sulfur-based sulfuric acid (330,000 t/a), feed-grade phosphate (300,000 t/a) and sodium fluorsilicate (20,000 t/a). Having applied advanced technique in the production of feed-grade phosphate, Sinochem Yunlong's product quality reaches the international advanced standards with two
certifications namely the International Organization for Standardization (ISO) and the European Feed Additives and PreMixtures Quality System (FAMI-QS). It not only receives warm welcome from the domestic market, but also enjoys good reputation in overseas market like East Asia, Southeast Asia, the EU and the US. Besides, Sinochem Yunlong owns high-grade phosphorus ore resources of 300 million tonnes, including four exploration rights and two exploitation rights.

In the chemical defluorination process (a process in the phosphate production line), hydrogen sulfide (H2S) residue will be separated from the phosphoric acid; however, owing to the equipment's operating instability, the H2S gas may flow over in the following process and cause poisoning to operators. In order to ensure the equipment safety and stability, Sinochem Yunlong aims to implement technical transformation on the dearsenization process of phosphoric acid. With a total investment of USD89.07 million (RMB547.78 million), three parts will be included in the construction, covering the dearsenization of phosphoric acid by Na2S (sodium sulfide), the blowing of H2S from phosphoric acid and the scrubbing-adsorption of H2S by 5% NaOH (sodium hydroxide). Meanwhile, three sets of equipment will be launched, including an acid mixer X 11001, an arsenic removal reaction groove R11001a,b and a H2S blowing groove V11003a,b. Waste gas, waste water, waste solids and noise will be generated in the construction, causing environmental pollution somehow. With a series of relevant solutions carried out, the pollution will be effectively controlled.

The implementation of the transformation project of phosphoric acid purification equipment presents that Sinochem Group stresses the importance of technical transformation and upgrading, and makes efforts to strengthen the competitiveness.

For one thing, Sinochem Group pushes forward transformation projects in its subsidiaries to enhance the overall technology and competitiveness, such as the 300,000 t/a energy saving project for sulfuric acid production, the 300,000 t/a wet-process dilute phosphoric acid project and the 240,000 t/a sulfur reinforced diammonium phosphate project in Sinochem Chongqing Fuling Chemicals Co., Ltd.

For another, Sinochem Group promotes the establishment of management systems covering standards, quality and performance evaluation among its shareholding companies, to further the reduction in production consumption, the improvement in product quality and the innovation in daily operation. For example, the total coal consumption of urea in Sinochem Jilin Changshan Chemicals Co., Ltd. decreased by 1.9% year on year in H1 2013. In addition, its total electricity consumption of urea witnessed a YoY decline of 2.0% at the same period.

Regarding its production enterprises, Sinochem Group also helps check the key equipment, follow the operation conditions and deal with the equipment failures to improve their stability.
YTH puts multifunctional equipment for soluble fertilizers into operation

On 1 Apr., 2014, Yunnan Yuntianhua Co., Ltd. (YTH) announced to put its 10,000 t/a multifunctional equipment for soluble fertilizers into operation. Launched on 24 Feb., 2014, it took 20 days for the installation of body equipment. Meanwhile, it successfully passed the one-off trial operation on 19 Mar.

Yunnan Three Circles Chemical Co., Ltd. (Three Circles Chemical), a branch of Yunnan Yuntianhua International Chemical Co., Ltd. (YTHIC) designs and establishes this multifunctional chemical equipment for the production of varied soluble fertilizers based on the replacement of raw materials. It aims to take full advantage of refined phosphoric acid and extend its industrial chain, to further meet the market demand. With less investment, short construction period and mature production technology, the equipment enables the product to be crystal, high-purity and completely water-soluble.

Three Circles Chemical is a large state-owned enterprise to first apply wet-process phosphoric acid for the production of high-concentration phosphate fertilizers. It boasts comprehensive capacities for the production of sulfuric acid (1.75 million t/a), phosphoric acid (550,000 t/a), triple superphosphate (340,000 t/a), monoammonium phosphate (240,000 t/a), potassium sulfate (18,000 t/a), hydrochloric acid (18,000 t/a) and sodium fluosilicate (35,000 t/a).

Phosphorus flame retardant project signed in Guizhou Province

In Mar. 2014, Weng'an County, Guizhou Province and Guizhou Yuanyi Mining Group Co., Ltd. (Yuanyi Mining) signed a project contract concerning phosphorus flame retardant, with a total investment of USD37.40 million (RMB230 million). It is targeted to own a capacity of 5,000 t/a, with a predicted annual output value of USD73.17 million (RMB450 million). As a hi-tech innovative project, it is jointly developed by Yuanyi Mining, Ningbo Institute of Materials Technology & Engineering, Chinese Academy of Sciences and the National Engineering Research Center for Compounding and Modification of Polymer Materials.

The miniaturization of electron and electric equipment, and the application of electric welding lead to the use of new engineering plastics characterized by excellent thermal stability, chemical stability and mechanical property. However, conventional halogen-free flame retardant cannot meet the requirements on processing and performance. Therefore, the development of halogen-free flame retardants, especially high-end phosphorus flame retardants, with high thermal and chemical stabilities, excellent electric property and improved flame retardancy, is capturing more and more attention in the world.

Currently, there are no halogen-free flame retardants for large-scale commercial production at home and abroad. The successful implementation of phosphorus flame retardant project by Weng'an County and Yuanyi Mining will not only meet strong demand in the market, but also ground electronic industry in transformation and upgrading.
Shihlien China and Jiangsu Luling sign fertilizer project

On 19 Mar., 2014, according to the government of Suqian City, Jiangsu Province Shihlien China Holding Co., Ltd. (Shihlien China) and Jiangsu Luling Chemical Industry Group Co., Ltd. (Jiangsu Luling) successfully signed a new ecological fertilizer project.

It is disclosed that the project is settled in Shuyang County with a total investment of USD180 million (RMB1.1 billion), including mining and selection of phosphorus ore, and production of new fertilizers and plasterboards. It is predicted that the annual revenue will reach USD240 million (RMB1.5 billion) with a total profit of USD32.5 million (RMB200 million). The cooperation between Shihlien China and Jiangsu Luling will not only further the introduction of foreign capital and advanced technology for Jiangsu Luling but also enables Shihlien China to take full advantage of its talents, capital, technology and other aspects.

Jiangsu Luling is a national high-tech enterprise which focuses on three main businesses, including new ecological fertilizers, new energy materials and mineral resource development. Its products are mainly exported to India, Southeast Asia, Africa and other countries and regions. Through 10 years of efforts, it has established a complete industrial chain. Moreover, it ranks first in phosphate fertilizer industry in Jiangsu Province concerning the comprehensive scale. Also, it is one of the top 10 phosphate fertilizer manufacturers in China, top 100 chemical fertilizer manufacturers in China, and top 500 chemical enterprises in China.

Canadian company exploits plentiful phosphorus ore in Peru

In Mar. 2014, the Canada-based Focus Ventures Ltd. (Focus) started the Bayovar phosphorus ore mining project in Sechura Desert, Peru, Pacific Coast. The mining project has been officially licensed, with two construction points started. Twenty wells open in grid pattern, covering nearly 1,400 ha. The wells are drilled vertically for easy reach of phosphorus ore, the horizontal distribution layer having a thickness of 50 metres diatomite and sandstone. Phosphate is located below the surface of 30 to 50 metres, with similar grade and thick seam. Focus hopes the phosphorus ore can reach evaluation criteria of the National Instrument 43-101 Standards of Disclosure for Mineral Projects of Canada. The reserves of phosphorus ore in Bayovar total 80 million-100 million tonnes with a grade of 30% P$_2$O$_5$.

Bayovar phosphorus ore mine is the largest mine in South America. In Apr. 2010, the Brazil-based Companhia Vale do Rio Doce (Vale) agreed to sell 35% shares (valued at USD385 million) of Bayovar mining project to the Mosaic Company, and 25% shares (valued at USD275 million) to Mitsui Group. Vale retains the control of the Bayovar project, including 51% voting shares and 40% capital stock. Currently, Bayovar mine is mainly exploited by a joint venture formed by these three enterprises.
Political Factors

Brazil imposes provisional anti-dumping duty on China's sodium acid pyrophosphate

On 17 Mar., 2014, the Camex-Camara de Comercio Exterior (the foreign trade commission in Brazil) decided to impose provisional anti-dumping duty of USD769.37/t-USD2,225.34/t on sodium acid pyrophosphate imported from China for six months. The HS code of the involved Southern Common Market is 2835.39.20. According to China Chamber of Commerce of Metals, Minerals & Chemicals Importers & Exporters (CCCMC), Hubei Xingfa Chemicals Group Co., Ltd. (Hubei Xingfa) is involved in this case, whose largest export destination is Brazil. There are only a few months left for the final ruling. Hubei Xingfa is currently under appeal.

The reason why Brazil imposes anti-dumping duty on China's sodium acid pyrophosphate is that it hasn't yet recognize China as a market economy country; however, it verifies the dumping margin of Chinese export enterprises by issuing the "surrogate country (the US)" policy. It is demonstrated in the accusation that the ex-works of China's sodium acid pyrophosphate is USD3,615.585/t, while the export price (FOB price) is USD1,218.50/t. Accordingly Brazil believes that China dumps sodium acid pyrophosphate by a reduction of USD2,397.08/t, with a dumping margin reaching 196.7%.

Technology

Dry dedusting technology to decline phosphorus slurry content to 1%

Summary: The application of dry dedusting technology can remove 90% dust in electric arc furnace. As a result, the content of phosphorus slurry in yellow phosphorus will decline from 10%-15% to 1%.

In Feb. 2014, China established a standard for yellow phosphorus industry, namely Assessment Indicator System of Cleaner Production for Yellow Phosphorus Industry, which stresses the technology for energy saving and emission reduction, such as dry dedusting, tail gas utilization and thermal energy recycling from waste residue. Of this, dry dedusting technology dominates an important position, since it is step by step recognized and mastered by enterprises in China. Furthermore, it is of great significance to enterprises, as it largely reduces production cost and effectively improves the environmental conditions. Currently, there is only one domestic enterprise namely Yunnan Lufeng Zhongsheng Phosphate Co., Ltd. achieves the success in technology transformation.

Regarding the other two technologies, tail gas utilization is relatively mature in China with about half of the enterprises involved in application, but thermal energy recycling from waste residue still undergoes R&D with no equipment for industrial operation.
### Table 1: Requirements for emission of main pollutants in yellow phosphorus production, 2014

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Generation volume</th>
<th>Emission volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste water</td>
<td>No outward emission with a close circulation of monophosphate-enriched water</td>
<td>Cleaned waste water: 0-10 m³/t</td>
</tr>
<tr>
<td>Tail gas</td>
<td>2,500-4,000 m³/t</td>
<td>0-4,000 m³/t</td>
</tr>
<tr>
<td>Phosphorus slurry</td>
<td>0.25 t/t</td>
<td>Internal treatment.</td>
</tr>
<tr>
<td>Waste residue</td>
<td>8-10 t/t</td>
<td>8-10 t/t</td>
</tr>
</tbody>
</table>

*Source: Assessment Indicator System of Cleaner Production for Yellow Phosphorus Industry*

**Mechanism of dry dedusting technology and its effect brought to enterprises**

To apply dry dedusting technology, an electrostatic precipitator is installed in the furnace outlet, so as to remove the dust before the yellow phosphorus gas is condensed. For one thing, it can remove 90% dust to decrease the content of phosphorus slurry in yellow phosphorus from 10%-15% to 1%, which contributes to the cleaner production of yellow phosphorus. For another, since dust is removed beforehand, water consumption can be decreased to weaken the pressure of water circulation system and reduce the circulation and treatment of waste water. Therefore, part of the equipment for water treatment can be cut back.

Compared with common wet dedusting technology in the production of yellow phosphorus (one tonne), dry dedusting technology can save electricity by nearly 1,000 kWh, water by 30 m³, energy by 0.3 tonnes (calculated by coal equivalent) and operating cost by USD162.59 (RMB1,000), which not only brings economic growth to enterprises, but also boosts great environmental and social effect.

In addition, dry dedusting technology presents the following advantages compared with conventional wet dedusting technology.

- Eliminate the discontinuous production processes including air washing, phosphorus recycling, refining and phosphorus slurry recycling. It will contribute to the automatic control of yellow phosphorus production. Since the dust is treated preliminarily, it reduces and simplifies the following tail gas purification and further decreases the purification cost, providing conditions for the production of high added-value chemical products based on tail gas. Besides, dry dedusting technology can be applied in the production of microelement fertilizer.

- Though phosphorus ore should be preprocessed like grinding and sintering before the input into equipment, causing increases in energy consumption and production cost, it will reduce some following processes, especially the costs in waste water and dust treatment.

Obviously, dry dedusting technology boasts significant effect in energy saving and emission reduction. Specially, its breakthroughs and industrialization in phosphorus ore powder sintering granulation technology and coke ore bond granulation technology provides...
full support for its further promotion.

Currently, the lack of equipment still draws back the transformation from wet dedusting technology. However, with the strengthening supervision on environment and the enhancing standard on yellow phosphorus, it is predicted that the enterprises will balance the comprehensive effects and apply dry dedusting technology.

Background

Yellow phosphorus is a resource-oriented product with high energy consumption. It somehow impacts on the environment. Part of the product is listed by the Ministry of Environmental Protection in the list concerning high energy consumption and serious pollution.

With years of development, especially in recent ten years, yellow phosphorus industry has witnessed a rapid development and become a distinctive industry in China.

According to China Inorganic Salts Industry Association, China ranks first in the production of yellow phosphorus, with a total capacity of over 2.3 million t/a. In recent years, with the development of large-scale electric arc furnace in China, the comprehensive utilization of tail gas, phosphorus slurry and waste residue leads to the large reduction in energy consumption.

As a whole, the production technology of yellow phosphorus in China has reached international advanced level. However, it is a big challenge for Chinese enterprises to deal with energy saving and emission reduction.

**Fudan University successfully fabricates new black phosphorus transistor**

Summary: With distinguishing characteristics, black phosphorus two-dimensional crystals open up bright prospects.

In Mar. 2014, Professor Zhang Yuanbo and his research team at Fudan University's Department of Physics finally fabricated a field-effect transistor (FET) using black phosphorus two-dimensional crystals. Along with grapheme and molybdenum disulfide, black phosphorus is yet another recently discovered two-dimensional semiconductor material, and has attracted wide attention.

A FET is a voltage-controlled transistor characterized by high input impedance and high integration level. Conventional FETs, based on semiconductor silicon, have wide application in electronic circuits. In recent years, scientists have been seeking new materials to improve the performance and expand functions of FETs. Two-dimensional crystals (stacked in monoatomic layers) have provided an interesting avenue for scientists to explore in their search for new materials.

CCM interviewed the project leaders, Professor Zhang Yuanbo and Researcher Li Likai. The pair identified black phosphorus' chemical activity as the main difficulty encountered in the two-year research, since it leads to deterioration on the sample's surface and further hampers the preparation and measurement of the very thin samples. Fortunately, the American Physical Society (APS) announced in its annual meeting findings that show such surface damage is due to oxidation, catalyzed by water and light. The research team was then able to avoid the problem by preparing the samples in an argon-filled glove box.

Researcher Li stressed potential applications of black phosphorus in microelectronic devices, since it boasts the following features:

- Band gap enabling the conductor to change into insulator and so activate the logic gate. Graphene, for example, has zero band gap; therefore graphene-based FETs cannot turn on and off, depriving such FETs of its basic function. Black phosphorus, on the other hand, has a direct band gap, presenting absolute advantages over materials such as silicon and molybdenum sulfide where
optical and photoelectric properties are concerned. The material’s direct band gap reinforces its suitability in processes involving light.

- High quality. The material presents high electron mobility (1000 cm²/Vs), and high modulation rate of leakage current. (10,000 times higher than graphene). Having qualities comparable to conventional silicon materials is of great importance if black phosphorus is to be widely applied.

- Two-dimensional atomic structure makes it suitable to the manufacturing of extremely thin electronic devices, while silicon-based devices, on the other hand, cannot be flattened past a certain point.

- Being an allotrope of phosphorus, an abundant material in nature, black phosphorus may be produced in large scales.

A combination of adequate infrared range and direct band gap also make black phosphorus a promising option for application in infrared electronic devices.

Picture 1: Structure of black phosphorus two-dimensional crystal field-effect transistor

Source: Nature Nanotechnology

Professor Zhang and Researcher Li are both confident that black phosphorus’ unique characteristics offer research possibilities into a wide range of applications. Their team plans to further investigate the material’s photoelectric properties.

So far, much theoretical work exploring black phosphorus’ interesting features has been conducted, particularly concerning band gap (changes based on the amount of layers), gap structure (changes based on the external environment) and anisotropic properties.

Professor Zhang and Researcher Li’s thesis, *Black Phosphorus Field-effect Transistors*, has been published on *Nature Nanotechnology*, which is sure to draw the attention of other researchers and further expand discoveries on the material.
Pilot plant using yellow phosphorus tail gas to prepare ethylene glycol and ethanol passes inspections

In Apr. 2014, the pilot plant using yellow phosphorus tail gas to prepare ethylene glycol and ethanol passed the on-site inspections from China Petroleum and Chemical Industry Federation (CPCIF). It is a project jointly established by Tianjin University and Guizhou Xinchen Coal Chemicals Group Co., Ltd. Of this, a 30,000 t/a industrial project of ethylene glycol has been launched, and will have its interim completion in June 2015. Innovatively, based on the same equipment and catalyst, the plant is targeted to only change operating conditions to produce ethylene glycol and ethanol with high selectivity. Also, it is the first pilot plant using industrial tail gas as raw material to prepare ethylene glycol. After a stable operation for over a year, the syngas-based systematic technology with independent intellectual property owned by Tianjin University, to prepare ethylene glycol and ethanol is proved to be of great reliability.

Moreover, regarding the stability of hydrogenation catalyst, Tianjin University conversed the operation at the temperature of 200°C (ethylene glycol produced with a selectivity <98%) and 270°C (ethanol with a selectivity <80% and lower alcohols with a selectivity <93% produced), indicating the high activity and high stability of hydrogenation catalyst. The on-site experts from CPCIF identified that the validity period of hydrogenation catalyst can last for 1.5 years. The successful implementation of the pilot plant presents a direction for ethylene glycol enterprises, that they can adjust the product structure based on the market dynamics to cut back the risks generated from overcapacity.

Gansu Wengfu’s 100 t/a liquid iodine recycling project passes inspections

On 4 Apr., 2014, Gansu Wengfu Chemical Co., Ltd. (Gansu Wengfu)'s 100 t/a liquid iodine recycling project passed inspections from Jinchang Environmental Protection Bureau. It is a typical project for Gansu Wengfu to take comprehensive advantage of resources. There are no waste water, waste gases and waste solids generated from the production. Moreover, processes like the recycling of waste water and waste gases are completely in line with the requirements from the Environmental Protection Law. The project will contribute to the treatment of liquid iodine in Gansu Wengfu, the improvement in resource utilization and the pressure relief from the shortage of iodine resources.

The technology has been listed by the Ministry of Land and Resources of the People’s Republic of China in the first batch of the Promotion Catalogue of Advanced Technology for Mineral Resource Saving & Utilization. With high technical content and economic practicality, the technology enables low-grade iodine to be generated from phosphorus ore, indicating that the industrial production of iodine is realized. It is disclosed that Gansu Wengfu takes the lead to invent this technology reaching the international advanced level. It applies the processes like catalytic oxidation and improved blowing method with two-section absorption, to extract iodine from very low iodine-enriched (less than 50mg/L) dilute phosphoric acid. The indicators of the refined iodine products meet the requirements from the national secondary standards (GB1622-79).
MAP and DAP in China soar in exports in Feb. 2014

Summary: In Feb. 2014, the exports of MAP and DAP in China soared. It is predicted that the exports of phosphate fertilizers will maintain stable with small increases in H1 2014.

In Feb. 2014, China's phosphate fertilizers saw sound exports, of which monoammonium phosphate (MAP) and diammonium phosphate (DAP) both witnessed sharp increases. Previously in Feb.-Mar. 2013, China didn't export any MAP; however, it exported 102,111.4 tonnes in Feb. 2014 only, with a MoM increase of 302.6%. Besides, the export volume of DAP reached 252,758.3 tonnes in Feb. 2014, increasing by 98.6% month on month and 399.6% year on year.

The reasons for the sharp export increases in China's phosphate fertilizers in Feb. 2014 vary in many aspects.

For one thing, due to the sluggish market in China, many phosphate fertilizer producers resorted to exports.

-Raw materials. The sulfuric acid market maintained a stable supply in Feb., while more and more suppliers for smelter acid and sulfonic acid, like Tongling Nonferrous Metals Group Holding Co., Ltd., Jiangxi Copper Corporation and Hunan Yongli Chemical Co., Ltd. suspended their production for equipment maintenance.

-Demand for phosphate fertilizers. Owing to the Spring Festival and cold weather condition in Feb., domestic farmers and relevant enterprises put off their fertilizer purchasing, leading to the overstocking for phosphate fertilizer producers.

-Transportation cost. During the Spring Festival, the domestic transportation cost increased somehow, reducing the enterprises’ revenues and further worsening the business.

Together with the export support from the Chinese government, phosphate fertilizers preferred exports.

For another, the overseas demand for phosphate fertilizers was strengthened.

-Supply. Since the largest phosphate fertilizer supplier in the Middle East, Saudi Basic Industry Corporation (SABIC) has no export plans before late Apr. 2014, countries and regions in Southeast Asia and Central Asia were targeted at China for fertilizer imports. Therefore, the exports of phosphate fertilizers in China in Feb. 2014 witnessed sharp increases.

-Demand. As it is a fertilizing period in Feb. for foreign countries, farmers demand more fertilizers. Moreover, the rapid development of planting in countries strengthens demand for phosphate fertilizers. However, their own inventories cannot meet the demand. For example, Pakistan imported DAP totaling 53,652 tonnes from China, which accounted for 57.7% of the total export volume in China. According to statistics, the inventory of phosphate fertilizers in Pakistan totaled only 100,000 tonnes in Feb. Due to the shortage in natural gas, the largest DAP manufacturer in the country, Fauji Foundation has suspended the production, causing the sharp increase in exports for China in Feb.

In Mar.-Apr. 2014, China's phosphate fertilizers would continue the exports, owing to the overcapacity in domestic market and the limited exports from other foreign suppliers. Subsequently, since India will import large amounts of phosphate fertilizers, and the Chinese government will issue preferential export policy for phosphate fertilizers in slack season, the export is predicted to rise in...
Apr.-May 2014. However, since the international capacity of phosphate fertilizers is strengthening, China's exports will be held back somehow. Therefore, CCM predicts that the exports of MAP and DAP in China will maintain stable with limited increases in H1 2014.

On one hand, the glut in domestic phosphate fertilizer market will drive up the exports. Since Feb. 2014, the market has stayed inactive. Regarding MAP, the domestic enterprises have finished the previous orders and received few orders to continue the production. Moreover, with the end of the fertilizer stocking (late Mar.) for farmers and the coming of slack season, the MAP manufacturers will reduce the prices and start their inventories, or limit and even suspend the production to protect their interest, and further transfer to overseas market. Regarding DAP, the overcapacity holds back the price increase. The fertilizer stocking in China has come to an end. Though DAP is mainly consumed in Shandong Province in autumn, such a weak demand is unable to push forwards the price increase. Therefore, the DAP producers will prefer to self-inventories and exports, with India (small inventory of phosphate fertilizers) to be the major destination. In addition, the Chinese government will issue preferential export policy for phosphate fertilizers, so the exports will continue to rise.

On the other hand, affected by the strengthened capacity in the world, the exports of phosphate fertilizers in China will witness limited increases.

As the main export destination for China, India import large amounts of phosphate fertilizers (70% of China's total exports) from China. However, according to recent statistics, the average cost and freight (CFR) of DAP in India reached USD520/t, while the CFR of China's DAP to India amounted to USD540/t. Such a difference of USD20/t indicated that high production cost and transportation cost, and low profit exerted heavy pressure on Chinese enterprises. What's worse, Saudi Arabia put its 3 million t/a DAP production line into operation in 2013. With its advantages in sea transportation and production cost, Saudi Arabia quickly grabbed the market shares in India, causing heavy pressure on China's exports. Besides, India launched its own DAP production lines in 2013. For instance, it cooperated with Arab Emirates to establish a 1 million t/a DAP plant. Moreover, the US-based Fluor Corporation and Bechtel Corporation launched DAP production lines in Saudi Arabia. If these projects are put into operation, they will further expand the international capacity of phosphate fertilizers. Therefore, Chinese enterprises will be held back in exports.

<table>
<thead>
<tr>
<th>Product</th>
<th>Export volume, tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP</td>
<td>102,111.4</td>
</tr>
<tr>
<td>DAP</td>
<td>252,758.3</td>
</tr>
</tbody>
</table>

Source: CCM and China Customs
Table 3: Top five export destinations of MAP and DAP in China, Feb. 2014

<table>
<thead>
<tr>
<th>Product</th>
<th>Destination</th>
<th>Export volume, tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP</td>
<td>Australia</td>
<td>58,877.7</td>
</tr>
<tr>
<td>MAP</td>
<td>Thailand</td>
<td>18,337.7</td>
</tr>
<tr>
<td>MAP</td>
<td>The US</td>
<td>15,455.0</td>
</tr>
<tr>
<td>MAP</td>
<td>Brazil</td>
<td>7,367.8</td>
</tr>
<tr>
<td>MAP</td>
<td>Spain</td>
<td>808.0</td>
</tr>
<tr>
<td>DAP</td>
<td>Pakistan</td>
<td>53,652.0</td>
</tr>
<tr>
<td>DAP</td>
<td>Thailand</td>
<td>52,875.8</td>
</tr>
<tr>
<td>DAP</td>
<td>New Zealand</td>
<td>36,184.0</td>
</tr>
<tr>
<td>DAP</td>
<td>India</td>
<td>26,310.9</td>
</tr>
<tr>
<td>DAP</td>
<td>Japan</td>
<td>20,292.4</td>
</tr>
</tbody>
</table>

Source: CCM and China Customs

Yellow phosphorus in China increases continuously in price in Q1 2014

Summary: In Q1 2014, the price of yellow phosphorus in China witnessed an obvious increase. It is predicted to maintain stable in Q2 2014.

In Q1 2014, the price of yellow phosphorus in China increased obviously, from USD2,517/t in Jan. to USD2,570/t in Mar, up by 2.1%. With the coming of high-flow period, the main producers of yellow phosphorus in China like Yunnan Province will put back on production and relieve the supply pressure in the market. CCM predicts that the price of yellow phosphorus will witness a limited increase and maintain stable in Q2 2014.

The price increase of yellow phosphorus in Q1 2014 is attributed to the following reasons.

- Price increases in raw materials. For one thing, the up-regulation of electricity price in China exerted heavy pressure on high energy-consumption yellow phosphorus with a consumption of 14,000 kW·h per tonne. According to statistics, 60% production costs of yellow phosphorus come from electricity cost, indicating that the up-regulation of electricity price will sharply raise the production costs for yellow phosphorus enterprises. For instance, Yunnan Province, a dominant producer in China, issued the regulation policy of electricity price in high- and low-flow periods, appearing to reach USD0.05/kW·h (RMB0.32/kW·h) in low-flow period and USD0.04/kW·h (RMB0.22/kW·h) in high-flow period. Hence the electricity cost in low-flow period is about USD227.63 (RMB1,400) higher than that in high-flow period. For another, the price of phosphorus ore increased step by step. Since Feb. 2014, its ex-works price has begun to rise by USD1.63-3.25/t (RMB10-20/t), and reached USD73.17-78.04/t (RMB450-480/t) in Mar. It mainly resulted from the policies implemented by the main producers in China, which not only rectified the chaotic market, but also drove up the prices. In Apr. 2012, five major producers of phosphorus ore (accounting for 92% of the total output nationwide) including Yunnan, Guizhou, Hubei, Hunan and Sichuan provinces issued five proposals for resource management, covering the exploitation access, the mining rights and the regulation of total mining amount.

- Low operating rates and tight supply. The operating rates of domestic yellow phosphorus enterprises declined from 60%-70% in H2 2013 to 20% in Q1 2014. Affected by the low-flow period and the Spring Festival, almost all the yellow phosphorus enterprises in China suspended their production and consumed their inventories, except for only a few enterprises owning power generation equipment to maintain production. Therefore, the yellow phosphorus market encountered insufficient supply in a short term.
- Strengthening demand from downstream industries. After the Spring Festival, the overseas demand for phosphate fertilizers has been increasing, contributing to the exports of domestic enterprises. For example, the exports of monoammonium phosphate and diammonium phosphate saw MoM increases of 302.6% and 98.8% respectively in Feb. 2014, with the operating rates of 60%-70%.

Figure 3: Ex-works price of yellow phosphorus in China, Jan. 2014-Mar. 2014

Source: CCM

CCM predicted that the price of yellow phosphorus will maintain stable in Q2 2014, due to the following reasons. On one hand, the domestic market of yellow phosphorus is still undergoing overcapacity. Currently, the total capacity of yellow phosphorus has exceeded 2 million t/a, while the demand for it has only reached 900,000 tonnes. It is believed that with the coming of high-flow period, the domestic yellow phosphorus enterprises will put back on production and relieve the tight supply previously. Furthermore, the sufficient and even excess supply will hold back the price increases. On the other hand, the demand for phosphate fertilizers in China will weaken along with the end of spring ploughing, while that from overseas market presents uncertainty. Thus, the price increases will also be limited.

Price Update

Price monitoring of phosphate chemicals in Mar. 2014
Figure 4: Price of phosphorus ore in China, Mar. 2013–Mar. 2014

Note: Prices in Wuhan are Free On Boat (Yangtze River) in Yichang City. Prices in Guiyang City, Liangshan Yi Autonomous Prefecture and Kunming City are ex-works in, respectively: Kaiyang County (Guizhou Province), Leibo County (Sichuan Province) and Jinning County (Yunnan Province). All counties are abundant in phosphorus ore reserves. Both prices including VAT.

Source: CCM

Figure 5: Ex-works price of yellow phosphorus in China, Mar. 2013–Mar. 2014

Note: Ex-works price including VAT.

Source: CCM
Figure 6: Ex-works price of industrial-grade phosphoric acid in China, Mar. 2013–Mar. 2014

Note: Ex-works price including VAT.

Source: CCM

Figure 7: Ex-works price of food-grade phosphoric acid in China, Mar. 2013–Mar. 2014

Note: Ex-works price including VAT.

Source: CCM
Figure 8: Ex-works price of industrial-grade STPP in China, Mar. 2013–Mar. 2014

Note: Ex-works price including VAT.
Source: CCM

Import & Export

International trade of phosphate chemicals in Feb. 2014

Table 4: Variations in the export volume and export prices of China's staple phosphorus chemicals, Feb. 2014

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Export volume (tonne)</th>
<th>YoY</th>
<th>MoM</th>
<th>Export price (USD/t)</th>
<th>YoY</th>
<th>MoM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphorus ore</td>
<td>38,579.70</td>
<td>-40.95%</td>
<td>196.31%</td>
<td>149.48</td>
<td>-18.76%</td>
<td>-15.12%</td>
</tr>
<tr>
<td>Yellow phosphorus</td>
<td>477.00</td>
<td>40.71%</td>
<td>-70.78%</td>
<td>3858.66</td>
<td>0.76%</td>
<td>3.68%</td>
</tr>
<tr>
<td>Food grade PA</td>
<td>37,809.01</td>
<td>17.22%</td>
<td>-17.42%</td>
<td>774.4</td>
<td>-5.73%</td>
<td>-3.37%</td>
</tr>
<tr>
<td>TSP</td>
<td>18,966.10</td>
<td>30.13%</td>
<td>-44.32%</td>
<td>327.59</td>
<td>-9.51%</td>
<td>-15.94%</td>
</tr>
<tr>
<td>MAP</td>
<td>102,111.42</td>
<td>0.00%</td>
<td>302.55%</td>
<td>416.75</td>
<td>0.00%</td>
<td>4.74%</td>
</tr>
<tr>
<td>DAP</td>
<td>252,758.28</td>
<td>399.58%</td>
<td>98.57%</td>
<td>422.2</td>
<td>-21.03%</td>
<td>7.87%</td>
</tr>
<tr>
<td>P_2O_5</td>
<td>774.40</td>
<td>29.55%</td>
<td>-32.31%</td>
<td>1899.26</td>
<td>1.46%</td>
<td>-1.06%</td>
</tr>
<tr>
<td>POCO_3</td>
<td>358.00</td>
<td>42.06%</td>
<td>11.04%</td>
<td>1256.53</td>
<td>9.67%</td>
<td>7.07%</td>
</tr>
<tr>
<td>STPP</td>
<td>6,653.88</td>
<td>-17.71%</td>
<td>-52.21%</td>
<td>987.89</td>
<td>-1.10%</td>
<td>3.55%</td>
</tr>
</tbody>
</table>

Source: CCM and China Customs
Figure 9: Phosphorus ore exports from China, Feb. 2013–Feb. 2014

Source: CCM and China Customs

Figure 10: Export destinations of phosphorus ore from China, Feb. 2014

Source: CCM and China Customs
Figure 11: Yellow phosphorus exports from China, Feb. 2013-Feb. 2014

Source: CCM and China Customs

Figure 12: Export destinations of yellow phosphorus from China, Feb. 2014

Source: CCM and China Customs
Figure 13: Food-grade phosphoric acid exports from China, Feb. 2013-Feb. 2014

Source: CCM and China Customs

Figure 14: Export destinations of food-grade phosphoric acid from China, Feb. 2014

Source: CCM and China Customs
Figure 15: TSP exports from China, Feb. 2013-Feb. 2014

Source: CCM and China Customs

Figure 16: Export destinations of TSP from China, Feb. 2014

Source: CCM and China Customs
Figure 17: MAP exports from China, Apr. 2013–Feb. 2014

Note: In Feb., Mar. and May 2013, China did not export any MAP to other countries.
Source: CCM and China Customs

Figure 18: Export destinations of MAP from China, Feb. 2014

Source: CCM and China Customs
Figure 19: DAP exports from China, Feb. 2013–Feb. 2014

Source: CCM and China Customs

Figure 20: Export destinations of DAP from China, Feb. 2014

Source: CCM and China Customs
Figure 21: P2O5 exports from China, Feb. 2013–Feb. 2014

Source: CCM and China Customs

Figure 22: Export destinations of P2O5 from China, Feb. 2014

Source: CCM and China Customs
Figure 23: POCl₃ exports from China, Feb. 2013–Feb. 2014

Source: CCM and China Customs

Figure 24: Export destinations of POCl₃ from China, Feb. 2014

Source: CCM and China Customs
Figure 25: STPP exports from China, Feb. 2013–Feb. 2014

Source: CCM and China Customs

Figure 26: Export destinations of STPP from China, Feb. 2014

Source: CCM and China Customs
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