2007 Annual Report on Chinese Bismuth Market

1. Properties, distributions and applications of bismuth

1.1 Bismuth properties

Bismuth is a slivery-white, brittle metal, with low conductivity. Its density is 9.8 g/cm^3, melting point at 271.3℃ and boiling point at 1560℃.

1.2 Bismuth distributions

Bismuth, with a content of $2\times10^{-5}\%$ in the Earth's crust, mainly co-exists with lead, tungsten, and other metals and is usually produced as a byproduct.

Bismuth reserves are 330,000 tons all around the world on a reserve base of 680,000 tons. China is the largest country with rich bismuth reserves, with the reserve of 240,000 tons, accounting for 73% of the worldwide reserves. It has a reserve base of around 470,000 tons, taking a share of 69% in the world.

Bismuth resource is primarily spread in China, Australia, Peru, Mexico, Bolivia, America, Canada and Japan. In China, bismuth is scattered in 13 provinces and autonomous regions, with Hunan, Guangdong and Jiangxi provinces standing in the first three places in the term of reserves, adding up to 85% of the domestic reserves. Following the three major reserve bases are Yunnan, Inner Mongolia, Fujian, Guangxi, Gansu and so on.

1.3 Bismuth applications

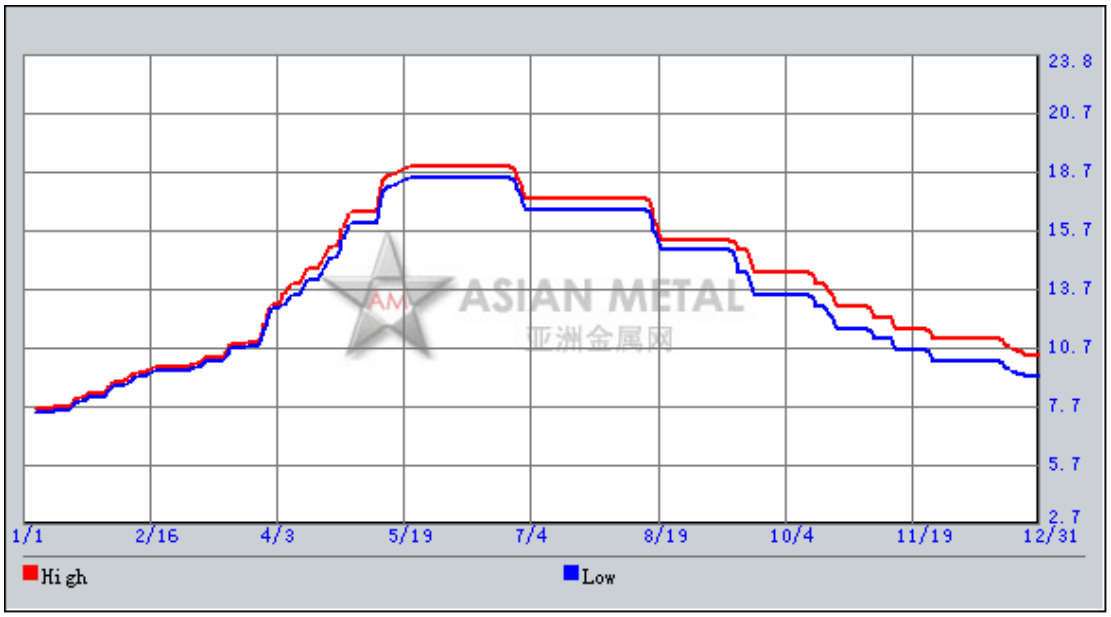
Bismuth medicinal compounds are used to treat burns, intestinal disorders, and stomach ulcers in humans and animals. Bismuth nitrate is the initial material used for the production of most bismuth compounds. Bismuth oxide is mainly used as additives in electronic element production and superconducting bands.

Bismuth metal is used as a metallurgic additive. For example, it is added to certain steel products to provide higher machinability. Likewise, it is used in small portions to aluminum and copper alloy to improve machinability.

Bismuth metal is also used as a major constituent of various alloys. For example, it can be

used in fusible (low-melting-point, as low as 20° C) alloys—combinations of bismuth with other metals, such as antimony, cadmium, gallium, indium, lead, and tin. Applications for those alloys include fuel tank safety plugs, holders for optical lens grinding, and other articles for machining or grinding, solders, and fire sprinkler triggering mechanisms.

2. Analysis on bismuth market in 2007



（Bismuth export price curve in China in 2007 on FOB basis）

With the bismuth export price as the analysis subject, we can see that the bismuth market experiences three different phases: rapid price increase, market confrontation and price decrease.

2.1 Rapid price increase (January 2007 – May 2007)

The price of bismuth 99.99%min climbed from USD7.70-7.90/lb early 2007 to USD 18.30-18.80/lb late May, with a sharp increase of 138%.

On September 14th, 2006, Chinese government announced to cancel the bismuth export rebate, which was followed by continuous price increase. On December 30th, Chinese government announced to impose export license policy on bismuth, which was interpreted that Chinese government was likely to impose export quota policy on bismuth. Therefore, foreign buyers made panic purchases before Chinese Spring Festival (Feb. 18th , 2007)

and the price kept going up.

After the Chinese Spring Festival, the price went up from USD 9.55-9.75/lb to USD 18.30-18.80/lb in May, up by 92%。Participants believed that price rise was combined results of Chinese smelters' continuously increasing prices and speculators' manipulating the market.

2.2 Market confrontation (May 2007-August 2007)

When bismuth price rose to the high of USD18.30-18.80/lb in May, consumers' purchase volumes reduced as their purchase interest was dampened. In June, July and August, deals in the market continuously decreased with the price dropping to USD15.00-15.50/lb late August, down by 18% as compared with the previous historical high of USD18.30-18.80/lb.

On August 11th, 2007, the "Chinese Bismuth Market Seminar", hosted by Jiangxi Rare Earth & Rare Metals Tungsten Group was held in Nanchang, Jiangxi Province. Fifteen Bismuth producers attended the seminar, including Jiangxi Rare Earth & Rare Metals Tungsten Group, Hunan Shizhuyuan Nonferrous Metal Co., Ltd., JCC (Guixi) Neo-Materials Co., Ltd., Kunming Bismuth Industry Co. Ltd. of Yunnan Copper Group, Hunan Zhaoshan Metallurgical Chemical Co., Ltd and Hunan Jinwang Enterprises Co., Ltd. After the seminar, the price saw a slow decrease, which showed that the seminar helped stabilize the market to some extent. However, the price continued to decrease from September, due to relatively supply excess after smelters increased their outputs in the first half of 2007.

2.3 Price decrease (September 2007 - December 2007)

From early September to the end of December, the bismuth price dropped from USD15.00-15.50/lb to USD 9.30-10.30/lb, down by 36%.

After the summer vacation, western participants did not increase their purchases, because the sharp price rise in the first half of 2007 had already dampened consumers' purchase interest and they wanted to cool down the spot market by reducing the purchase quantity, depending on long-term contract supply and consuming their inventories. Moreover, on September, 6th, MCP Aramayo Group and Sidech Group signed a merger contract, jointly establishing MCP Group SA headquartered in Belgium. In the following months, because

the above two companies mainly focused on personnel arrangement and internal adjustment, there were not many purchases.

On the other hand, the price continuously going up in the first half year stimulated the suppliers to increase outputs. With few purchases and relatively supply surplus, so the market saw a continuous price decrease during this period.

3. Big events in 2007 bismuth market

On December 30th, the Ministry of Commerce of PRC announced that China would impose export license policy of bismuth, including unwrought, wasted bismuth and powder (customs code: 8106001090) and other bismuth and its articles (customs code: 8106009090).

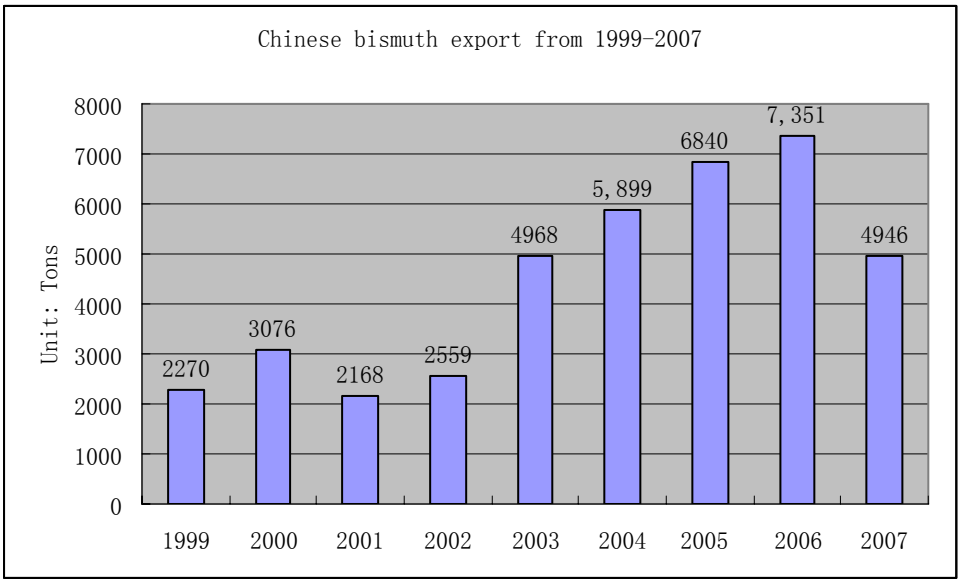
A seminar, held in Nanchang, Jiangxi province on Aug 11, attracted fifteen bismuth smelters, including Jiangxi Rare Earth & Rare Metals Tungsten Group, Hunan Shizhuyuan Nonferrous Metal Co., Ltd, JCC (Guixi) Neo-Materials Co., Ltd., Kunming Bismuth Industry Co. Ltd. of Yunnan Copper Group, Hunan Zhaoshan Metallurgical Chemical Co., Ltd and Hunan Jinwang Enterprises Co., Ltd and so on. Attendees would like to form Bismuth Industry Association to coordinate between each other.

On September 6th, 2007, MCP Aramayo Group and Sidech Group merged to establish MCP Group SA, headquartered in Belgium.

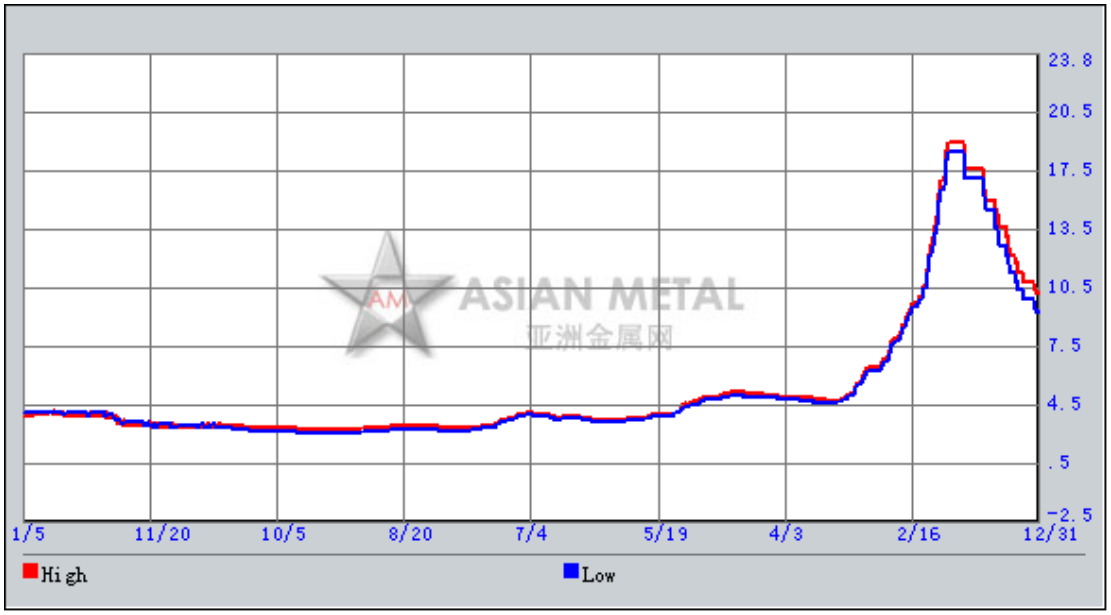
Late December, 2007, Ministry of Finance People's Republic Of China announced the import duties of unwrought bismuth (with the HS code of 81060010) will be 3% and 1% for the most-favoured-nation rate of duty and the provisional import rate of duty respectively in 2008. However, participants believe that the policy may not influence the market greatly, since China seldom imports unwrought bismuth.

Major bismuth producers in Hunan province may establish Hunan Bismuth Group, who will take charge of the complete sales of local producers. It is expected that Hunan Bismuth Group may begin to operation in the first half of 2008.

4. Chinese bismuth export from 1999-2007



(Source: Chinese Customs)



(Bismuth export price curve in China from 2001-2007 on FOB basis)

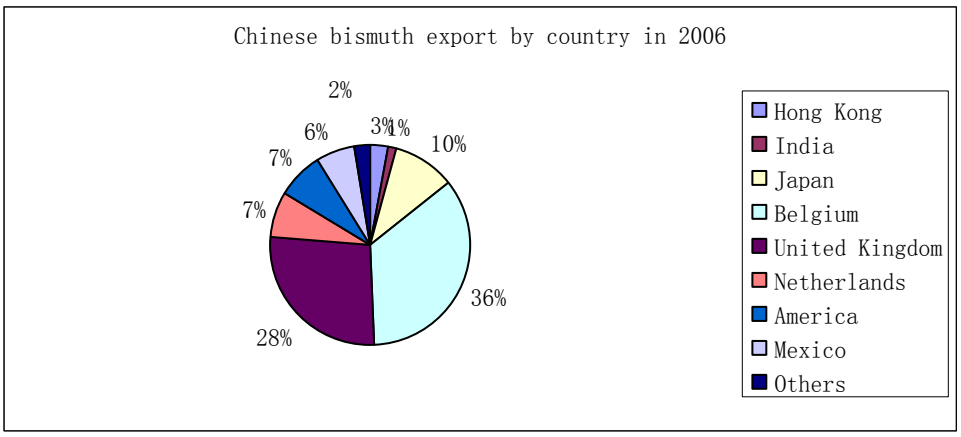
From the chart we can see that from 1999 to 2002, the exports of China's bismuth was relatively stable with an average annual export of 2,518 t. The bismuth export quantity began to increase rapidly from 2003, up by 94% than in 2002.

Participants held that the steady increase of China's bismuth export volume from 2003 to 2006 was mainly driven by the increasing demand from the downstream industries. The year of 2006 witnessed a total bismuth export volume of 7,351t and the export quantity

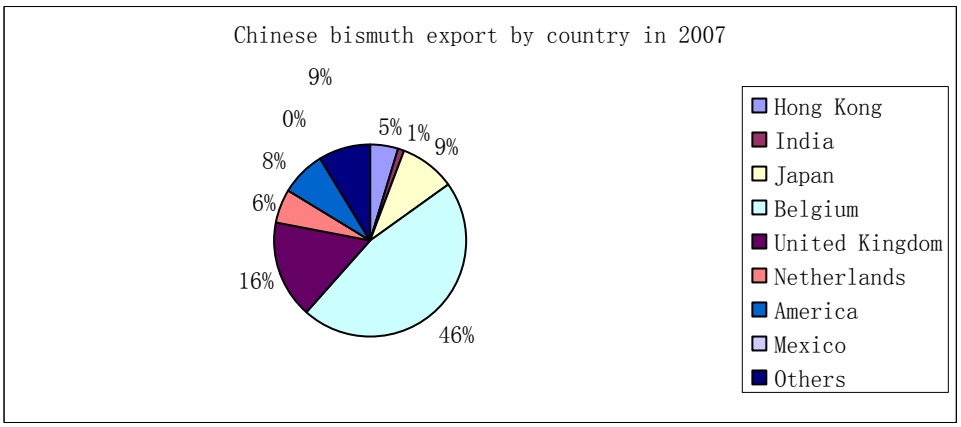
increase was caused by Chinese export policy changes, demand from end users and speculations.

In 2006, the lowest price was USD 4.20-4.30/lb in July, after which the price continuously went up to USD 7.60-7.80/lb up by 81%. In 2007, the bismuth price, from January to May, climbed to USD 18.30-18.80/lb, with an increase rate of 141% against that in the end of 2006. The significantly increased price slowed down purchases from consumers and also caused huge capital pressures on consumers. Therefore, the bismuth export volume decreased in 2007, down by 33% as compared with that in 2006.

5. Bismuth export analysis by country in 2006 and 2007



(Source: Chinese Cutoms)



(Source: Chinese Customs)

From the above charts, we can see that Chinese bismuth export percentage to Belgium increased from 36% in 2006 to 46%, while the percentage to Unite Kingdom decreased from 28% in 2006 to 16% in 2007.

6. Chinese bismuth supply and demand

6.1 Chinese bismuth supply

Major production basis	Outputs in 2007 (t)	Ratio
Hunan	5050	57%
Jiangxi	2500	28%
Others	1250	15%
Total	8800	100%

6.1.2 Bismuth raw materials in China

Chinese bismuth ore outputs increased since late 2006, stimulated by the bismuth price increase, but the main increases are from small mining and mixed mining such as Chenzhou in Hunan, Ganzhou in Jiangxi and Yunnan, while the outputs of some major bismuth ore companies do not increase significantly, for example, Hunan Shizhuyuan Nonferrous Metals Co., Ltd., Jiangxi Rare Earth & Rare Metals Tungsten Group, Inner Mongolia Xingye Group and Yangshan in Guangdong.

The output of bismuth as a byproduct also increases, which are benefited from the output increase of lead, copper and iron. The bismuth raw materials are mainly from lead anode mud, copper soot, tin anode mud, blast furnace soot of smelting pig iron and bottom Pb-Bi alloy.

Besides, China imports raw materials from America, Peru, Canada, Japan, Belgium, Kasakhstan and so on, among which import of bismuth raw materials from Peru increase significantly in 2007, when China may import 1,000t of bismuth, and about 300t from Nigeria and Bolivia.

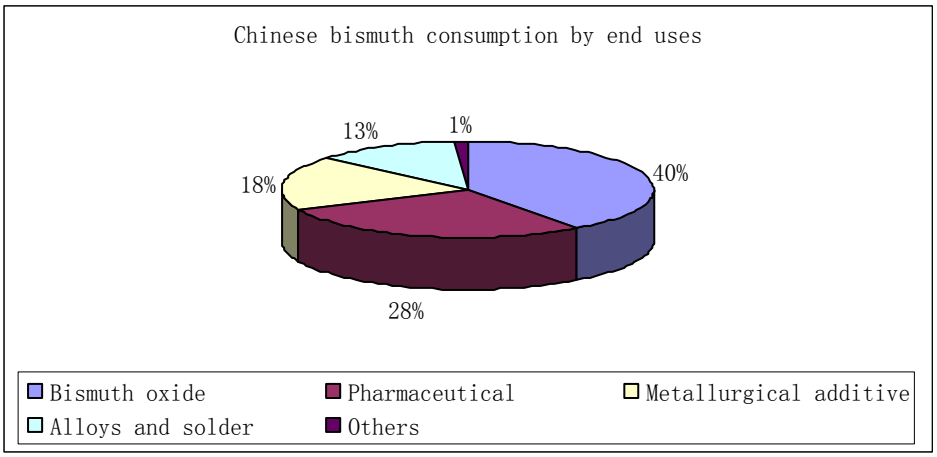
6.1.3 Bismuth production in China

The output of bismuth ingot tends to centralize in large companies, especially state-owned large companies. It is estimated that the outputs of Hunan Shizhuyan Nonferrous Metals Co.,Ltd, Kunming Bismuth Industry Co. Ltd. of Yunnan Copper Group, Ganzhou Non-ferrous Metal Refinery Co.,Ltd, JCC（GuiXi）Neo-materials Co.,Ltd, Hunan Zhaoshan Metallurgical Chemical Co.，Ltd, Hunan Jinwang Enterprises Co., Ltd., Nankang Jinji Nonferrous Metals Co., Ltd., Hunan Bolin Bismuth (Group) Co., Ltd., Guixi Sanyuan

Metallurgical Chemical Co., Ltd. and Taigu Shengde Nonferrous Metals Co., Ltd. account for two thirds of Chinese total bismuth output.

However, due to its low standard admittance, new bismuth smelters can easily start the productions, if the price goes up high. What's more, because it is easy to enlarge the production, major smelters show little interest to merge small- to medium-sized companies, which is another obstacle for the bismuth industry centralization.

6.2 Chinese bismuth consumption



It is expected that bismuth consumption increases by 10% year on year in the coming years. In terms of consumption volumes, China, America, Japan, European Union, Korea and India are major consumers of bismuth metal, among which consumption increase in China, Japan and Korea is significant, a combined result of bismuth oxide consumption and substitution of lead with bismuth.

In 2007, the consumption is estimated to be 3,240t in China, among which demand increase from bismuth oxide industry is sharp. From the above diagram, bismuth oxide producers consume 40% of China's total bismuth usage, pharmaceutical industry 28%, metallurgical additives 18% and bismuth alloy and solder 13%.

6.2.1 Major bismuth consumers in China

6.2.1.1 Bismuth consumers in bismuth oxide industry

Xianyang Yuehua Bismuth Industry Co., Ltd.

JCC (Guixi) Neo-Materials Company Limited

Chengdu Shudu Nano-Science Co., Ltd.
Sichuan Shunda New Materials Technology Development Co., Ltd.
Henan Huanyu Group Ltd.
Beijing Dangsheng Material Technology Co., Ltd.
Henan Maiteer Co., Ltd.

6.2.1.2 Bismuth consumers in the pharmaceutical industry

Liaoning Xinghai Pharmaceutical Co., Ltd.
Guangdong Shantou Xilong Chemical Co., Ltd.
Guangdong Taishan Xinning Pharmaceutical Co., Ltd.
Jinhua Mingzhu Pharmaceutical Co.,Ltd.
Guangdong Guanghua Chemical Co.,Ltd.
Xiamen Meikang Pharmaceutical Co.,Ltd.
Changzhou Kangli Pharmaceutical Co., Ltd.

7. Factors which will influence bismuth market in 2008

7.1 Positive factors for the price increases

7.1.1 Substituting lead as a green metal may stimulate demand for bismuth metal

With the implement of European Union's RoHS code direction and requirements for non-toxic electric products in Japan and Korea, demand for bismuth is likely to increase as a substitute to lead. In 2007, Samsung Electronics, LG Electronics and Daewoo Electronics in South Korea began the plan to produce lead-free plasma display panels and Samsung Electronics will start using bismuth metal in its production of plasma display panels in 2008. Besides, Matsushita Electric Industrial and Hitachi in Japan also have the plan to carry out lead-free plasma display panel technology, which may increase their consumption of bismuth.

7.1.2 Demand increase for bismuth oxide may increase demand for bismuth metal

The year of 2007 witnessed high-speed growth in super-conductive industry. Bismuth oxide is an important additive in producing electric products, whose rapid development will also increase demand for bismuth.

7.2 Negative factors for the price increase

7.2.1 Higher price tending to increase supply

Tempted by high profits, current producers will have incentives to find more bismuth slag and take good use of low content raw materials. Those which did not produce bismuth in the past years will start operating for profits. Both would increase worldwide supply, which, thus, may depress the price rise.

7.2.2 Application of bismuth substitutes in some consuming sectors

Although bismuth can be used to replace lead in many areas, but it is challenged by tin and tungsten to substitute lead, if its price goes up significantly.