

# **Titanium in China – a rapid rising industry**

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Chairman of Chinese titanium Association

**Abstract: This paper analyses the changes and developments of the Chinese titanium industry in recent ten years, emphasis on the improvements of the capacity, output, market demand, import/export data, titanium industrial applications as well as the technical reconstructions in China. Also give some statement on the future developing trends of Chinese titanium industries.**

## 1. The expansion of the Chinese titanium industry within recent 10 years

The Chinese titanium processing industry started in 1954. After several decades of experience and research, China has formed an integrated titanium processing system. Especially during the past 10 years, along with the strong development of the Chinese economy, the titanium industry in China welcomes its splendid rising curve, driving into the fast lane of development.

### 1.1 The status of the Chinese titanium industry

In the past 10 years, the Chinese titanium industry has faced a series of important international events and has kept on rapidly growing.

During 2001-2003, the world titanium industry stepped into a downturn due to a slowdown of the global aviation industry. Driven by the rapid development of the Chinese economy, the titanium demand in chemical engineering, metallurgy and electric power industries increased quickly. At this period of time, the titanium sponge capacity continued to increase and the ingot melting capacity also increased rapidly.

From 2004 to 2007, the Chinese titanium industry kept in pace with the recovery of the world's titanium industry - titanium sponge capacity increased very fast while the increase of ingot melting capacity had apparently slowed down.

From 2008 to 2010, under the impact of the world financial crisis, there were almost no new investment projects within the Chinese titanium industry, but the capacity kept on increasing, resulting from the inertial forces of the previous investments.

Till 2010, both the titanium sponge capacity and mill products output reached the domestic record of 57,770 tons and 38,300 tons respectively. China has become one of the world's leading titanium manufacturing countries.

### 1.2 The capacity and output of Chinese titanium sponge and mill products in 10 years

This graph shows the development of titanium sponge and ingot capacity in China from 2002 until 2010. Within 10 years, the sponge capacity has increased by a factor of 26 and the ingot capacity has increased by a factor of 7.

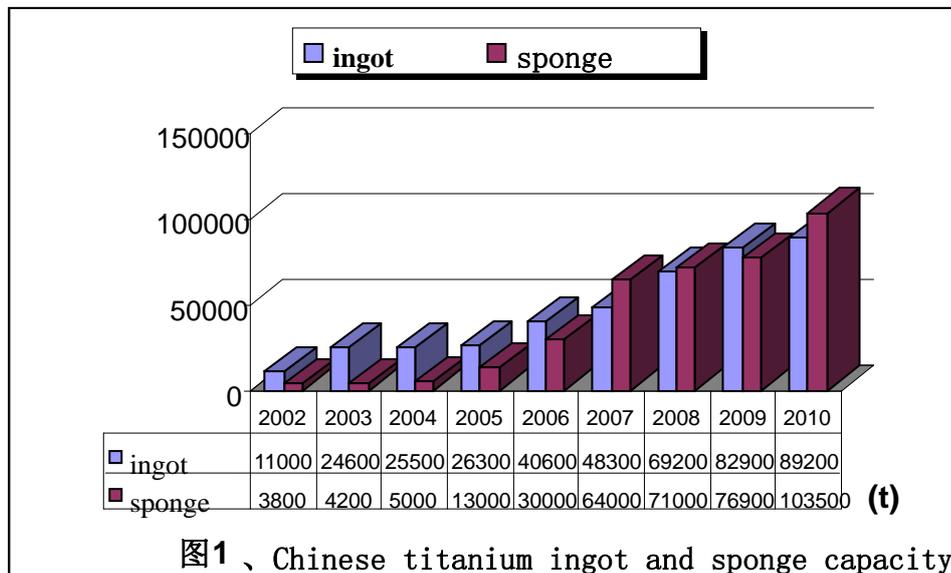


图1、Chinese titanium ingot and sponge capacity

This is the output of titanium sponge and mill products. In the past 10 years the average rate of increase is 40% for sponge and 32% for titanium mill products per year.

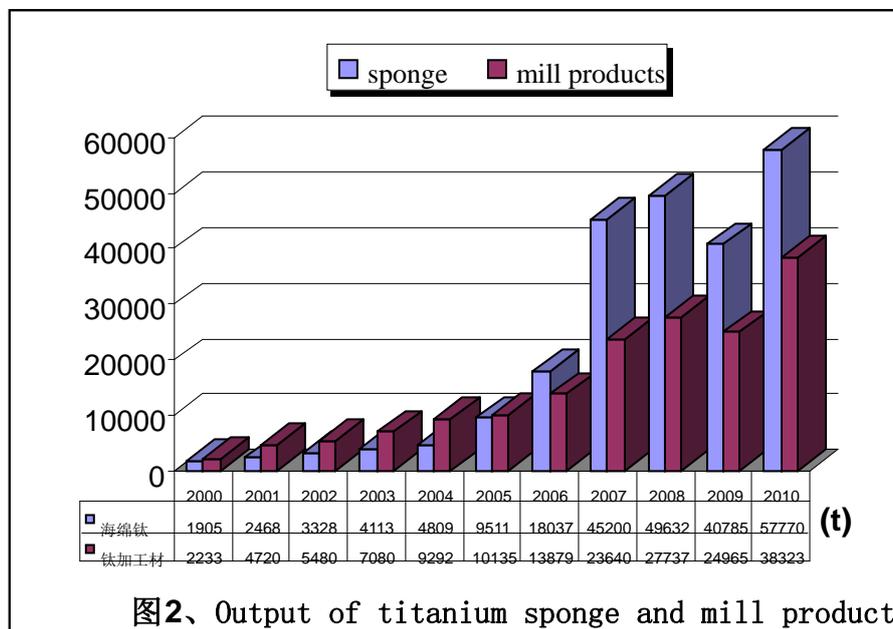


图2、Output of titanium sponge and mill products

### 1.3 The application areas of Chinese titanium products

In 2002, the demand for titanium mill products in China was 6,300 tons; in 2010 this figure increased 4.7 times to 35,600 tons - the average increase rate is around 21% each year.

In China, chemical engineering is the major market for titanium products, followed by aviation, sports & leisure and metallurgical industries. In 2010, 52% of titanium mill products went into the chemical engineering industry, whereas 10% went into the aviation industry.

We can also see that the demand of titanium in every industry has rapidly increased, especially after 2006.

#### 1.4 The import/export data for titanium sponge and mill products

In the recent 10 years, the imported titanium sponge has increased by 57% while the imported titanium products quantity has doubled. The continuous increase in titanium sponge capacity has resulted in a significant increase of sponge output and thus has reduced the demand for imported sponge. For titanium mill products, China has a large demand for titanium strip coils and welded tubes, which need to be imported.

The export of titanium sponge and mill products is also rapidly growing. In 2002 there was almost no sponge exported, while in 2010 the figure reached 3,500 tons. The mill products export quantity increased from 860 tons in 2002 to 7,500 tons in 2010, which is almost an increase of 8 times. This is profit from the rapid growth of capacity and the improvement of the manufacturing technology in titanium industries within China.

Starting from 2002, China maintained a high volume of import for titanium mill products, which is in line with the fast development of the Chinese economy and the continually increasing demand. China now has become a major import/export country for titanium materials.

## 2. The current situation of Chinese titanium industry

### 2.1 Progress of the manufacturing facilities of Chinese titanium industry

#### 2.1.1 Melting facilities

In recent years, the titanium manufacturing facilities in China have achieved a significant break-through. By the end of last year, there were around 200 sets of VAR furnaces larger than 1000 kg, among that about 40 sets of VAR furnaces larger than 3000kg. The ingot melting capacity has reached 89,000 metric tons. The leading titanium manufacturer in China, Baoji Titanium Industry Cooperation, will invest in further 4 sets of 15ton VAR furnaces. After these four furnaces are put into operation during the second half of next year, melting capacity will increase by at least 6,000 tons, compared to today's capacity of 20,000 tons.

Currently China has 7 sets of cold hearth furnaces in operation and there are still several additional projects are in planning phases.

### 2.1.2 Flat products facilities

Titanium flat rolled products are one of the hot-spots for investment in China. At the moment the titanium strip coil needs to be imported from other countries. Six strip coil production line has been invested Domestic produced titanium strip coil will results to a fast development on the welded tubes production and some thin thickness seamless tubes will be replaced by the welded tubes. Besides, some of the imported titanium coil for PHE applications will also be replaced by the domestic products.

Technical improvement is the key element for developing the outstanding performance of titanium and reduces the cost to meet the market demand. In this area China has achieved great success in metallurgical and processing techniques.

In 2010, China has successfully realized the industrial production of titanium sponge with hardness less than 95, and has small production capacities of sponge with a hardness level of 90. Meanwhile, the energy consumption for the production of sponge is steadily decreasing.

Zunyi sponge company has achieved a great breakthrough on the research of electronic grade high purity sponge; 20kg of sponge have been produced with a purity of 99.995%.

Luoyang Sunrui has realized the complete process route of titanium sponge and it's capacity has reached 10,000 tons per year. The power consumption to produce one ton of sponge has been reduced to 26,000 kwh.

Baoti, Baosteel, Western Metal Materials and WST have formed an advanced titanium melting system.

Baoti has successfully melted CP and alloy ingot with its EB furnace; The EB furnace in Baosteel is in operation and its plasma furnace is under trial production stage.

Western Metal Materials had its 2800mm wide hot rolling mill and 1780mm wide cold rolling mill put into production. By 2011 China will have its own production of titanium strip coil. The pickling, grinding, cutting, slitting and annealing line of Baoti has been put into production during this year and it's 20 high cold rolling mill will begin trial production towards the end of 2011.

## 2.2 Chinese titanium industry's market position

In 2007, the Chinese titanium sponge output reached a historic record level of 45,200 tons, ranking first place in the world. In 2010, the mill products output also ranks first place in the world, amounting to 38,300 tons. China is becoming one of the leading

titanium manufacturing countries in the world.

During the past 10 years, the Chinese titanium industry has greatly improved equipment and quality. Along with the continuous fast development of the Chinese economy, the capacity and output of titanium has also increased rapidly. Represented by Baoti, which is the largest titanium company in China, the Chinese titanium industry has the ability to develop new alloys and technologies, supply materials to meet the demand of conventional industries as well as the medical and aviation applications. But compared to the world's other main suppliers, the industrial distribution is not ideal enough yet - substantial integration is missing between the upstream and downstream titanium companies; the challenge for energy conservation and emission reduction in the titanium metallurgical industry is still very heavy; some kinds of mill products for specific applications still can not be produced in China. There is still a very long and hard path ahead in the development of the Chinese titanium industry.

### 3. Forecast of Chinese titanium industry

The timeframe between 2011 to 2015 will be an important period for the economic transition in China, which will rely on the green development strategy, quality up-grading and high technology. The titanium industry will welcome a splendid growth as it has been defined as new material and fits to the demand of economic developments.

There will be strong demand for the airplanes like A380, B787 and C919. The implementation of the space station and Lunar exploration project will lead to a strong demand increase for titanium material. We also believe that the demand for nuclear power stations, chemical engineering, metallurgy and the vacuum salt making industry will steadily increase. Along with the rise of living standards, the demand for titanium in medical and leisure fields will also be largely improved.

As a conclusion, we think the Chinese titanium market is in a fast development stage - the demand and output for titanium and its mill products will be doubled in the next five years. By 2015, the (Chinese?) annual demand for titanium sponge will be 150,000 tons (including the steel industry usage) and the demand for titanium mill products will be approximately 60,000 tons.

We believe that with the joint effort of all the titanium producers in China, we will have an even brighter future.

# **TITANIUM IN CHINA**

## **- A Rapid Rising Industry**

ZOU WUZHUANG



# Author Information



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- **General Manager, Baoti Group Ltd.**
- **Board Chairman,  
Baoji Titanium Industry Co., Ltd.**

**30 years work experience in Baoti**



# Content



1. **Expansion of the Chinese titanium industry within recent 10 years;**
2. **Current situation of Chinese titanium industry;**
3. **Forecast of Chinese titanium industry.**

# The expansion of the Chinese titanium industry within recent 10 years



## 1.1 The status of the Chinese titanium industry;

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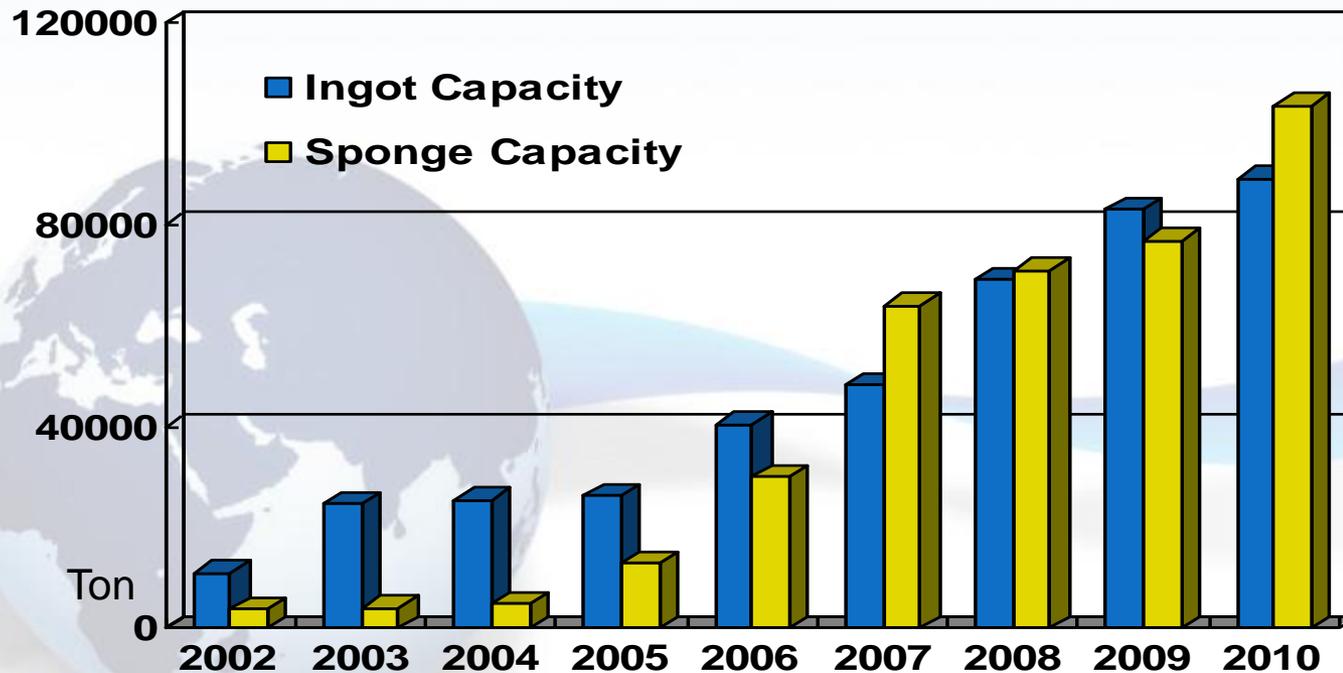
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# The expansion of the Chinese titanium industry within recent 10 years

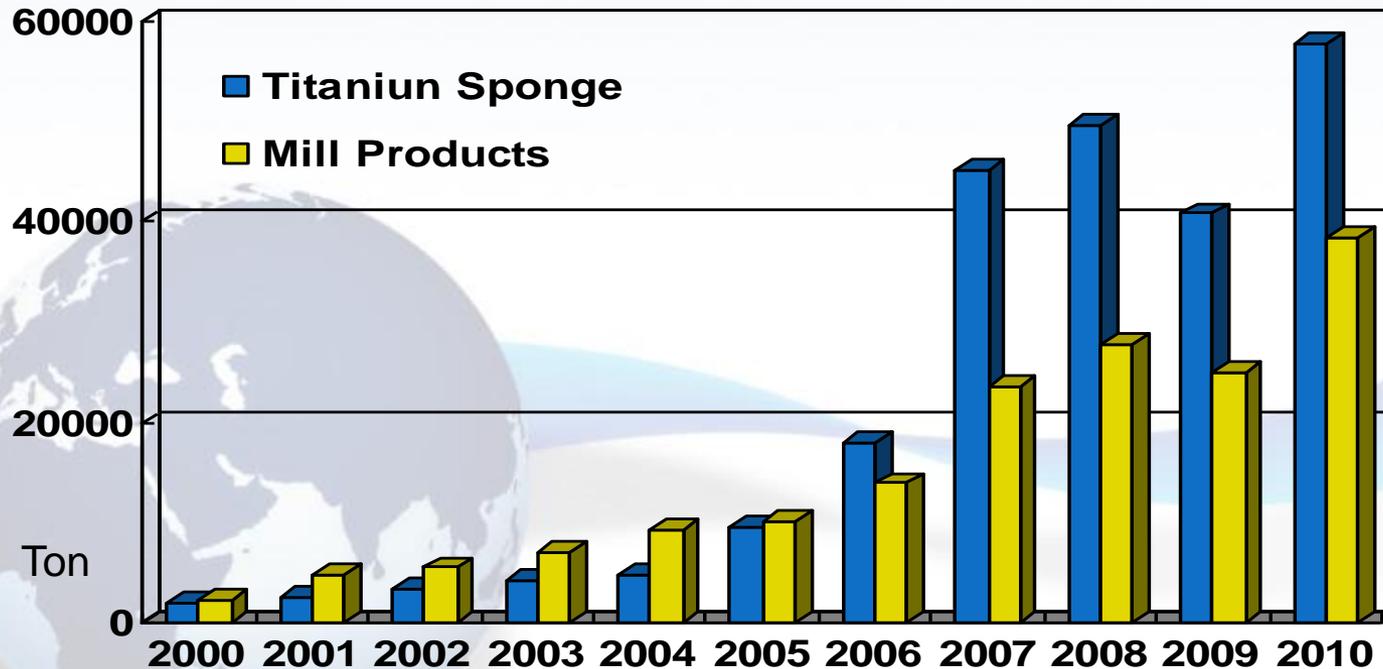


## 1.2 The capacity and output of Chinese titanium sponge and mill products in 10 years



Graph 1. Titanium sponge and ingot capacity in China from 2002 until 2010

# The expansion of the Chinese titanium industry within recent 10 years



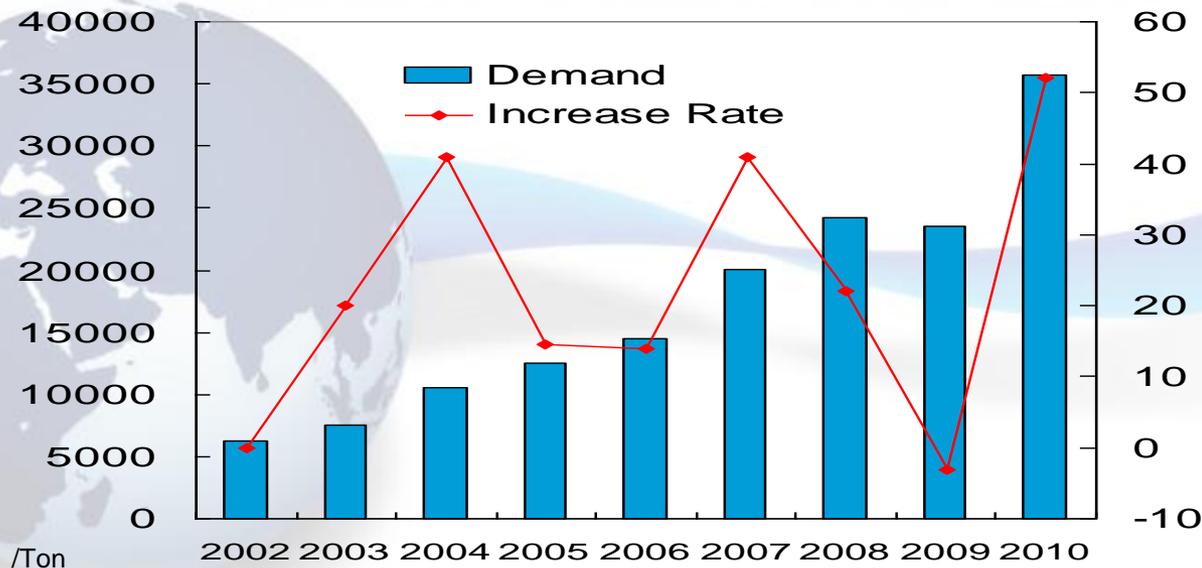
Graph 2. The output of sponge and mill products from 2000 until 2010

# The expansion of the Chinese titanium industry within recent 10 years



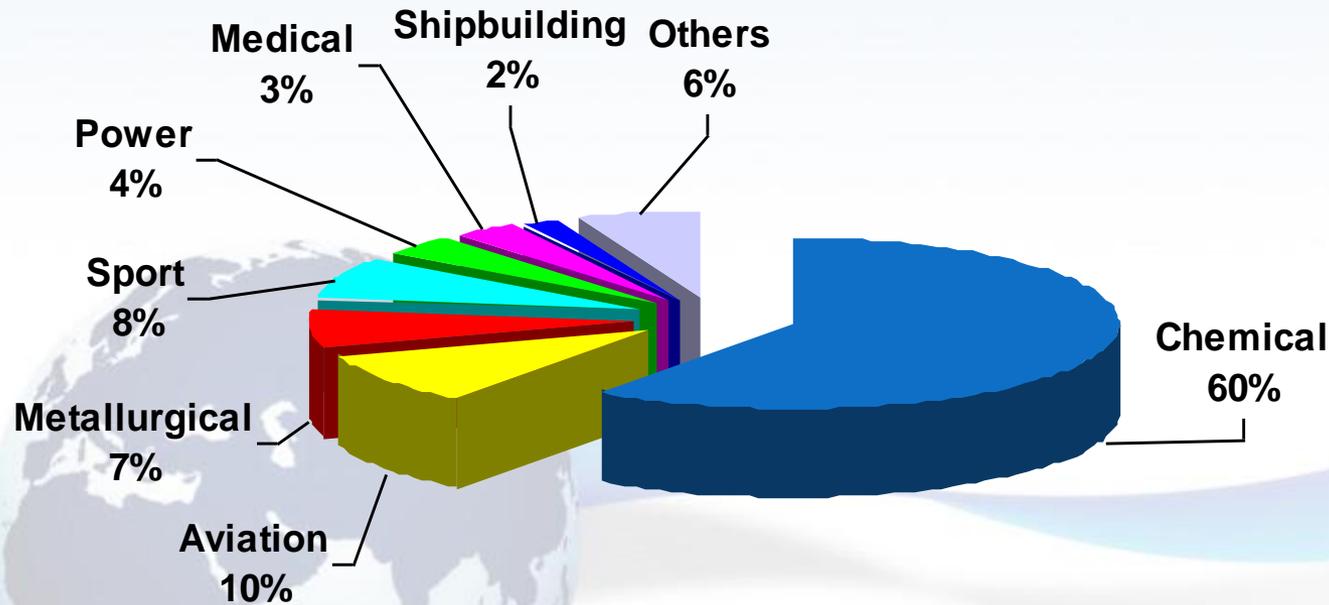
## 1.3 Application areas of titanium products

In 2002, the demand for titanium mill products in China was 6,300 tons;  
In 2010 this figure increased to 35,600 tons  
The average increase rate around 21% each year.



**Graph 3. The demand and increase rate of mill products in China from 2002 until 2010**

# The expansion of the Chinese titanium industry within recent 10 years



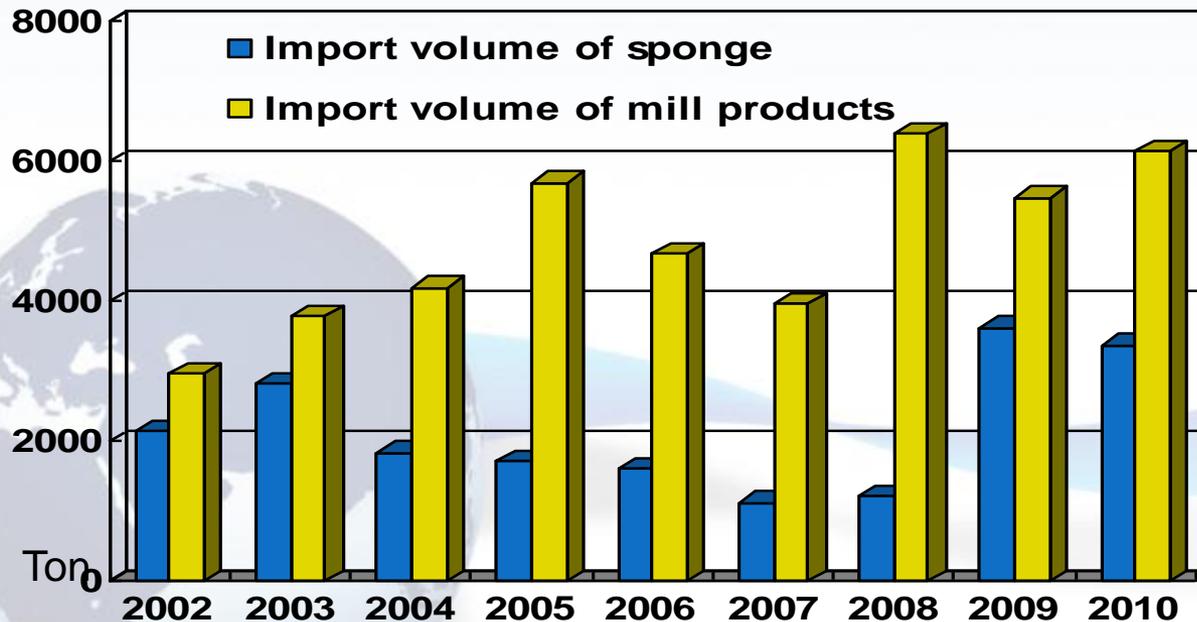
**Graph 4. The demand rate of mill products in China**

In China, chemical engineering is the major market for titanium products, followed by aviation, sports & leisure and metallurgical industries.

# The expansion of the Chinese titanium industry within recent 10 years



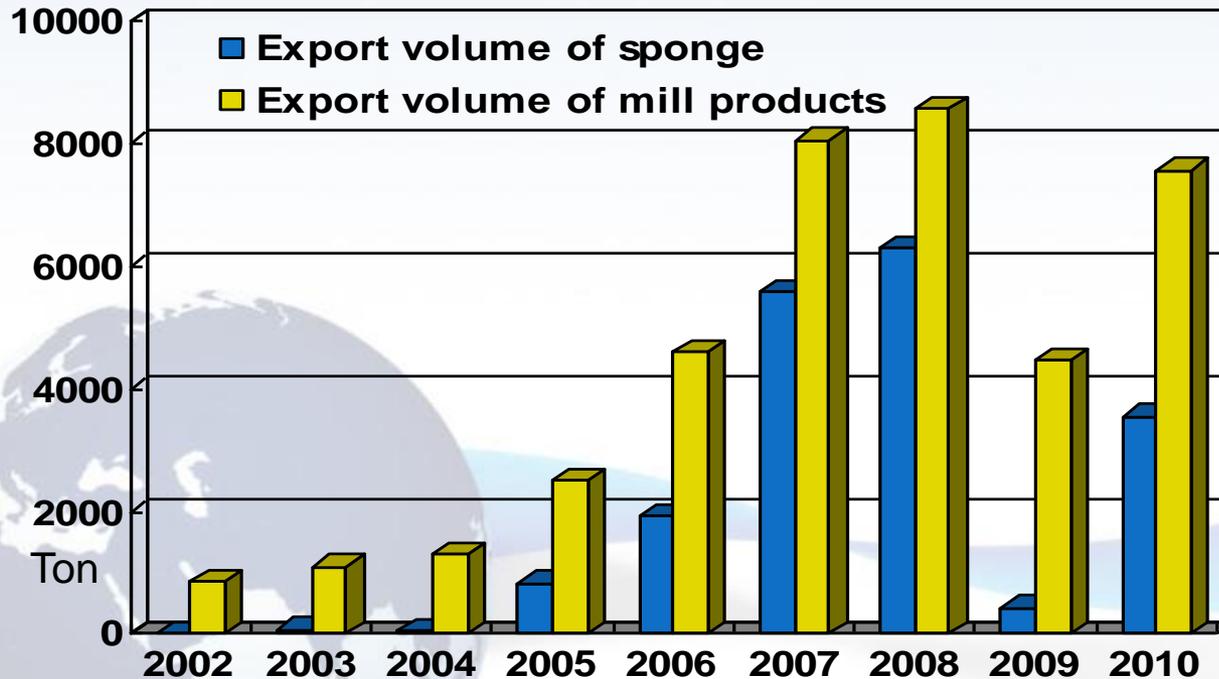
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Graph 5. The import volume of titanium in China from 2002 until 2010

In the recent 10 years, the imported titanium sponge has increased by 57% while the imported titanium products quantity has doubled.

# The expansion of the Chinese titanium industry within recent 10 years



Graph 5. The export volume of titanium in China from 2002 until 2010

Profit from the rapid growth of capacity and improvement of technology in Chinese titanium industry, export quantity of sponge and mill products also increased rapidly.

# The current situation of Chinese titanium industry



## 2.1 Progress of the manufacturing facilities

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The ingot melting capacity reached 89,000 metric tons.

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# The current situation of Chinese titanium industry



Currently China has 7 sets of cold hearth furnaces in operation :

- 3 sets 2400KW EB
- 2 sets 3200KW EB
- 1 sets 3600KW EB
- 1 sets 3200KW Plasma Furnace



# The current situation of Chinese titanium industry



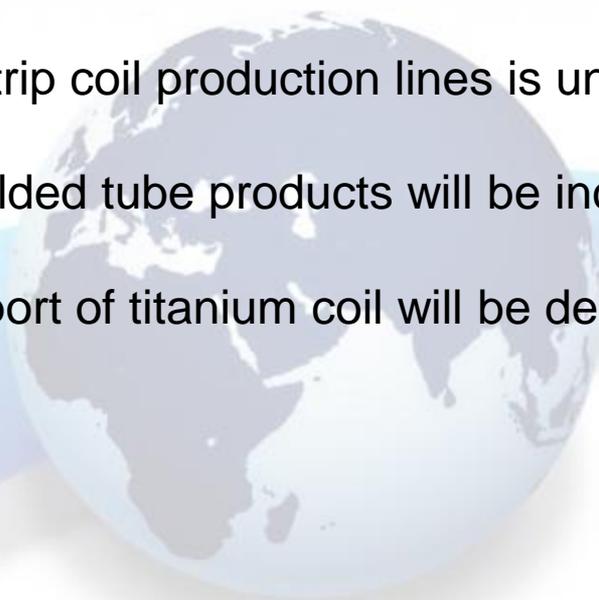
## 2.1.2 Flat products facilities:

Titanium flat rolled products are one of the hot-spots for investment in China.

6 strip coil production lines is under construction

Welded tube products will be increased

Import of titanium coil will be decreased

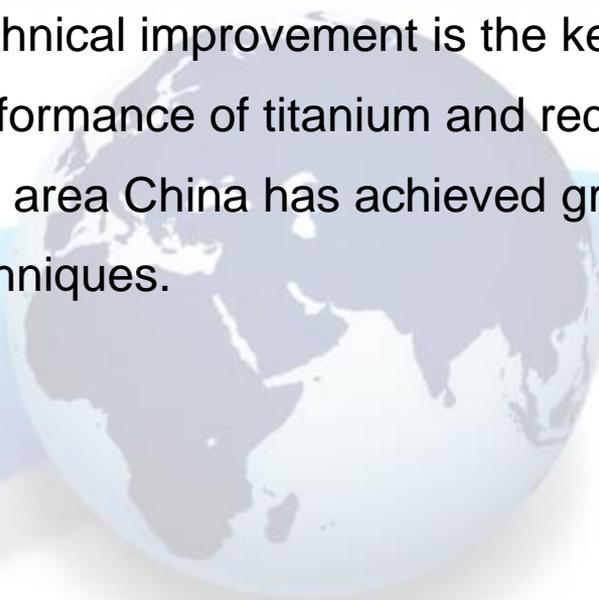


# The current situation of Chinese titanium industry



## 2.2 Technology development progress in China

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In 2010, the mill products output also ranks first place in the world, amounting to 38,300 tons. China is becoming one of the leading titanium manufacturing countries in the world.

Despite to the fast increasing on quantity, there is still a very long and hard path ahead in the development of the Chinese titanium industry.

# Forecast of Chinese titanium industry



The timeframe between 2011 to 2015 will be an important period for the economic transition in China, which will rely on the green development strategy, quality up-grading and high technology.

The titanium industry will welcome a splendid growth as it has been defined as new material and fits to the demand of economic developments.

# Conclusion



As a conclusion, we think the Chinese titanium market is in a fast development stage - the demand and output for titanium and its mill products will be doubled in the next five years. By 2015, the Chinese annual demand for titanium sponge will be 150,000 tons (including the steel industry usage) and the demand for titanium mill products will be approximately 60,000 tons.

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**THANK YOU**

