Current Situation of Alumina Industry in China and its Technical Demand

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Abstract

In China in 2018 the alumina production capacity was about 83 Mt, and the alumina production output was about 72 Mt. That constitutes more than 50 % of world production. The Chinese bauxite reserves are approximately 1billion ton and the bauxite resource is about 5 billion ton. About 80 Mt of bauxite was imported into China in 2018. Due to the characteristics of the alumina industry and nature of the local bauxite resource in China there is a high demand for efficient alumina production technologies for low grade bauxite, high sulfur bauxite as well as imported bauxite and impurity control technologies.

Keywords: Low grade bauxite, high sulfur bauxite, alumina production technology, alumina impurity control, bauxite residue.

1. Current Situation of Alumina Industry in China

Alumina production technology in China started from sinter process in Shandong alumina refinery (the former of Shandong Branch, Chalco), and the first alumina refinery was built and put into operation in July 1954.

The second alumina refinery, Zhengzhou Alumina Refinery (the former of Henan Branch, Chalco) was built and put into operation in 1965, the Bayer and Sinter mixed process was adopted for the first time.

China's alumina industry had good progress after decades of efforts. In 2001, China became the world's second largest alumina producer, since 2006 the output was more than 10 million tons, and in 2007 China became the world's largest alumina producer.

The changes of alumina production capacity and output in China in the last ten years are shown in figure 1.

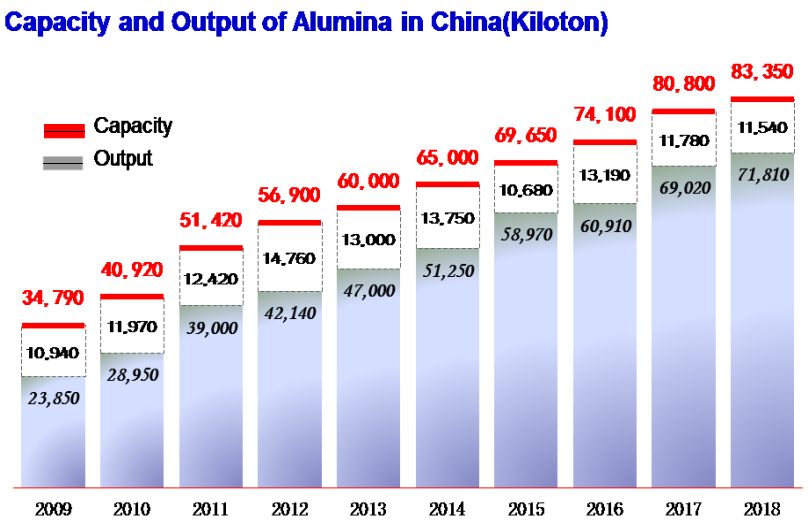

Figure 1. Alumina production capacity and output in China in the last ten years.

By the end of 2018, China's alumina production capacity was 83.35 million tons. The alumina output was 71.81 million tons, accounting for about 55 % of the global alumina output of 130 million tons.

Alumina producers in China are mainly located in Shandong, Shanxi, Henan, Guizhou, Guangxi provinces and Chongqing with imported bauxite resources or with local bauxite resources.

Figure 2 shows the distribution of alumina production in China in 2018.

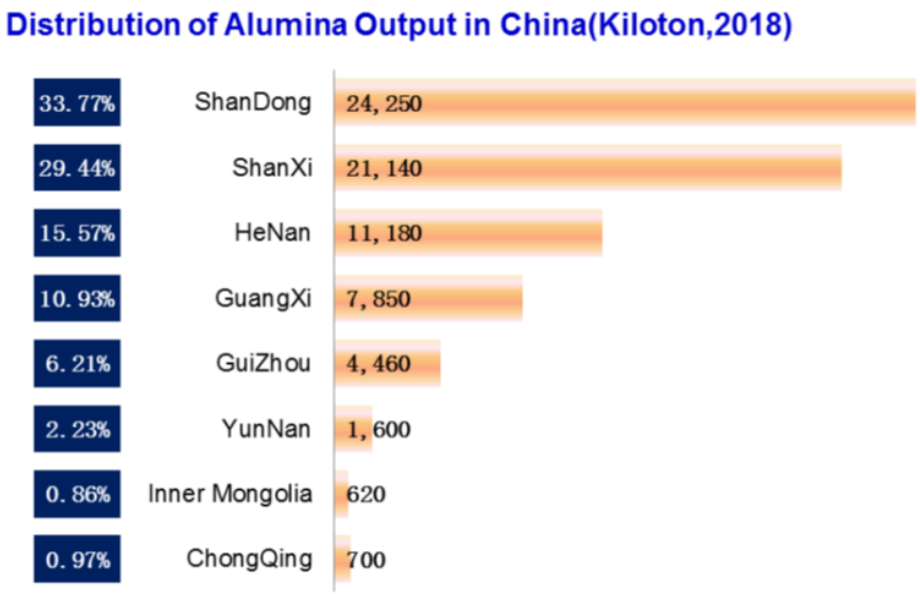

Figure 2. Distribution of alumina production in China in 2018.

It can be seen from figure 2 that Shandong province is the largest alumina producer in China, with annual alumina output of 24.25 million tons in 2018, accounting for 33.77 % of the national alumina output. The Bauxite used in Shandong is almost exclusively imported bauxite. More than a third of China's alumina production was produced from imported bauxite in 2018. By April 2019, China's complete alumina production capacity, which mainly relies on imported bauxite, had increased to 40.5 million tons, and its operating capacity to 30.77 million tons.

technologies used in foreign refineries such as seawater neutralization can not fully adapt to China's conditions.

The wet deep oxidation technology successfully developed by Zhengzhou Research Institute of CHALCO can control the organics effectively in the high temperature Bayer process. However, it is necessary to develop the control technologies for organics in the low temperature Bayer process using imported bauxite according to the characteristics of the bauxite and alumina production technologies.

3.2.7. Bauxite Residue Treatment Technology

Large-scale economic comprehensive utilization of bauxite residue is still a worldwide problem. There is significant research efforts on the comprehensive utilization of bauxite residue at home and abroad, but none of them can deal with and utilize the bauxite residue economically and effectively so as to solve the problems of safety and environmental protection brought by bauxite residue effectively. Industrial application in recovering iron from high iron bauxite residue has been achieved in China [10].

The technical route of large-scale comprehensive utilization of bauxite residue economically mainly includes: using the bauxite residue to produce various kinds of building materials after removing alkali, using the bauxite residue for road building materials after solving alkali seepage and bauxite residue denaturation, using the bauxite residue as filler in composite materials, using the bauxite residue as acidic soil improver, using the bauxite residue to treat acid sewage and waste residue, using the bauxite residue for extracting valuable elements (such as iron, titanium, rare earth elements, etc.).

4. Conclusions

The development trends of the Chinese alumina industry science and technology are determined by the nature of the bauxite resources, the characteristics of the alumina production process and environmental protection policies in China. It is expected that the production of alumina by both domestic and by imported bauxite will coexist in China for a long time.

Two major technical challenges for China's alumina industry are how to improve the technical and economic indicators of alumina production from bauxite in China on the premise of clarifying the development strategy of the alumina industry in China, and how to use the imported bauxite with high efficiency and economically.

The main technical requirements for high efficiency utilization of bauxite in China include efficient technology for processing of low-grade diasporic bauxite and high sulfur bauxite, and organic control technology in the alumina production process.

The main technical requirements in the efficient and economic utilization of imported bauxite also include the selection of efficient production technologies and the control strategy for organics in the alumina production process.

5. References

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