



中信大锰矿业有限责任公司

DAMENG CITIC DAMENG MINING INDUSTRIES LIMITED



# **Development Direction of EMM Production Technology**

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- ▶ **Cleaning, energy-saving and environmental protection will be the ultimate goal of EMM enterprises**

### **3, Factors and measures of restricting the development of production technology**



## 1、Produce process and equipment tecnolgy

- A、 The main production with carbonic manganese ore, typical enterprises scatter in xiushan of chognqiong province\huayuan of hunanprovince\daxin jingxi of guangxi\ changyang of hubei and songtao zunyi of guizhou. But many enterprises have been without the mineral dressing.
- B、 Some Chemosynthetic-processes enterprises could add the raw materials mechanically. (insert image). the typical processes are lifting\tanker\adding materials with screw machine.but still lots of enterprises add the materials with manpower,especially the early founded peanuts(scale under the 5000T/Y).
- C、 Membrane filter press is the mian tecnology in the process of solid-liquid separation.some enterprises use the filter-press in three section so as to strenqthen the Solution purification;a few enterprises could pressly filter rough residue and sulfide slag step by step,further to recycle the heavy metal.some install high-pressure menbrane equipment and blowback cleaning device to control the residue moisture below 25%. (insert image). still some use frame-type filter press ,achieving a smaller filtering area.
- D、 Ordinary level is to add Se in electrolysis,the high-purity grade to add SO2 .electrolysis unit still is trogue with PVC.poor insulativity,all electrolysis in small trogue. (insert image).
- E、 the product late-stage disposal still use manpower,some enterprise get board with machine ,a few could stripp plate mechanically.



## 2、 Environmental Technology

technology present situation

A、 Chemosynthetic processes generally installed mist absorbing devices, the non-organization emissions of acid mist have been effectively controlled (insert picture).

B、 Chromium-containing wastewater commonly used the neutralization method of ferrous sulfate +lime to deal so as to be utilized recycling. (Insert picture).

C、

Manganese-containing waste water widely used the neutralization method of lime to deal so as to be utilized recycling. (Insert picture).

D、 Some enterprises have installed devices to monitor the plasma of Mn, Cr, PH on-line, further to make the dynamic management of wastewater come true. (Insert picture).

E、 utilization of Manganese slag is still in research stage.



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Technology developing Trend

## 1、 The scale of production and equipment to the large-scale development

- A、 Single manganese production line will reach 3 million tons (at present has reached 15 thousand tons) (insert image).
- B、 Single compounded tank volume will exceed 300M<sup>3</sup> (now about 260M<sup>3</sup>).
- C、 A single pressure filtration equipment, filter area will exceed 1000M<sup>2</sup> (now about 500M<sup>2</sup>).
- D、 A single electrolytic cathode and anode plate area will break 2M<sup>2</sup> (currently 0.56M<sup>2</sup>).



## 2、 The production process to the mechanization and automation

A、 Mechanical compounded feeding processes will be fully realized, continuous leaching will be widely used.

huiyuan Manganese Industry in Guangxi has adopted the continuous leaching process.

B、 Pressure filtration processes will realize the mechatronics of importing pulp - Washing - scum.State Environmental Science Research Institute and Hubei Jing Jin Corporation have draw up and begun to promote the use of industrialization,.Xiushan、 Wuling Manganese Industry have adopted the application.

C、 Electrolytic processes will realize mechatronics from loading slot - outboard - washing - drying - stripping board.

three Friends chemical enterprise in zhejiang has been designed and begun to promote the use of industrialization, Hunan luxi、 Jinxu Metallurgical company has taken thelead in the applications.

D、 on-line monitoring and regulation will be automated in Electrolysis process, wooden electrobath will gradually be replaced by modified Polypropylene electrolytic cell with better insulation properties ,and electrolysis could get on in large trough.

Hubei Changyang, Ningxia TianYuan, have adopted the application firstly , but electrolysis is still in small trough.



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### 3、 Production processes to diversify

Technology developing Trend

A、 the carbonic manganese ore production still is the mainstream of electrolytic manganese.

carbonic manganese ore widely distributed , abundant reserves,. costs of procurement and processing is lower, and the powder after grinding could chemiste directly with high levels of calcium and magnesium with high consumption of acid .

40% of the acid consumption has been absorbed by calcium and magnesium.

The experiment results indicate that grade of manganese up 2% , the recovery raising1%,and ore consumption to reduce 800kg, acid consumption to reduce 400kg, manganese slag to reduce 1 ton.

Qualified enterprises should carry out the work of mineral enrichment.



### 3、 Production processes to diversify

- B、 production of Oxidized Manganese will coexist with the production of carbonic manganese
- The breakthrough of reduction made the low-grade oxidized manganese application to be universal
- Rotary kiln, shaft kiln firing technology have been perfect, but the thermal efficiency is lower, firing cost higher, further to impact on its promotion.
- The useageof Microwave roasting technology solved the problem of low thermal efficiency.now people have been developed industrial prototype and it is expected to replace the rotary kiln firing process.
- The experiment of using waste of sugar-refining as the pilot has entered the industrial test stage, the successful application of the reduction process saved the cost of roasting and will control cost the same as the cost of the production of carbonic manganese.
- production of Two mine mixed in one-step has aplicated in very few enterprises, but the product quality is unstable (S exceed), affecting its popularization.
- C、 Chromium-free deactivation process will be widely used
- Some enterprises have begun to apply,as long as improving the non-chrome deactivation agent to prolong storing period , Chromium-free deactivation process will be widely used.
- D、 Non-Se-products will be popular
- A, B-class products have been come true without selenium, but the efficiency of no selenium-electrolysis' current is lower and power consumption is higher ,impacting on the dissemination . As long as to improve the electrolysis process ,the current efficiency still has room for improvement.



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Technology developing Trend

## 4、new breakthrough of utilized waste will happen

A、 Gas will be recycled effectively

Take the carbonic Manganese mine in Guangxi Daxin for example, 1 ton of manganese will produce 1.2 tons of CO<sub>2</sub> gas, the point of producing gas in the chemical combination process. Acid Mist -absorbing device has filtered the dust, and the remaining all CO<sub>2</sub> gas directly ejectes through the chimney. If the CO<sub>2</sub> can be recycled, 1 enterprise with 3-million tons of manganese per year can reduced 3 million tons of CO<sub>2</sub> so as to benefit the nation.



B、 full usage of Manganese slag maybe come true .

- many research institutes and institutions have made extensive research in the comprehensive utilization of manganese slag ,furthermore the samples have been made successfully . such as building -brick, accessories of cement etc.;
- slags after vulcanization by step get through simple acid washing and residue extraction ,people could recycle the cobalt and nickel from the slag. Still take the mine in Guangxi Daxin carbonic Manganese ore for example, one factory with 3-million tons of manganese could recycle 30 tons of metal cobalt nickel per year, increasing profit of 15 million yuan.
- If neutralization and deironing go on separately, people can further recycle the  $\text{Fe}(\text{OH})_3$  from the slag . Still take the carbonic Manganese mine in Guangxi Daxin for example, one factory with 3-million tons of manganese could recycle 10,000 tons of  $\text{Fe}(\text{OH})_3$  per year , increasing profit of 5 million yuan.



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Technology developing Trend

**5、** Cleaning, energy-saving, environmental protection will be the ultimate pursuit of the electrolytic manganese business.



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