Qinghai Salt Lake “Green Mg” Drives Green manufacturing

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Qinghai Salt Lake “Green Mg” drives industrial Green manufacturing

Comprehensive development and utilization of Salt Lake resources
---- Raw material support for “Green Mg”

Hydro-Solar-Wind energy combination in Qinghai
---- Energy support for “Green Mg”

Advanced bischofite direct electrolysis process
---- Technology support for “Green Mg”

“Made in China 2025” and lightweight demand
---- Policy support for “Green Mg”
Qinghai Salt Lake Mg integrated project targets 100kmt annual capacity, with MgCl2 as raw material and using advanced process based on Norsk Hydro’s proven technology.
Comprehensive development and utilization of Salt Lake resources ---- Raw material support for “Green Mg”

- Using waste brines from KCl fertilizer production as raw material, applying Norsk Hydro proven electrolysis technology with additional breaking through and optimization on brine purification and dehydration processes.
- 100 kmt production facility has been established for the first stage, and the second stage expansion has been started.
Using Hydro-Wind-Solar mixed green power and waster brine rich of MgCl2 as raw material, Qinghai Salt Lake Mg project is superior to traditional Pidgeon process using high carbon containing dolomite or magnesite as raw material, in terms of environmental friendliness.
Qinghai Salt Lake Mg electrolysis process applies the most environmental friendly design and technologies. It produces and offers the “Greenest” Mg in the world and helps downstream users to develop various GREEN solutions.
On 22nd Aug. 2016, President Xi visited the Qinghai Salt Lake project. He highly appreciated the Salt Lake resources as well as the integrated exploration design and process.
Qinghai Salt Lake will be committed to comprehensive development and utilization of salt lake resources and construction of integrated production chain, aiming to build an ecological Mg-Li-K park and offering low carbon emission green raw materials to the market.
Hydro-Solar-Wind energy combination in Qinghai
---- Energy support for “Green Mg”

Electricity

The latest development shows hydro-solar-wind green power accounts for around 90% in Qinghai’s local power production.
Hydro-Solar-Wind energy combination in Qinghai
---- Energy support for “Green Mg”

1）Origin of 3 major Chinese rivers (Yangtze, Yellow and Canglan), best Hydro power resources;

2）Good solar resources in Chaidam Basin area. Millions kV solar power stations have been built in Golmud area.

3）Qinghai 330KV, 750KV power grid and local solar power base have formed a strong power grid, which ensures the power supply of the Mg electrolysis plant.

盐湖开发---绿色开采・分级提取・综合利用
Hydro-Solar-Wind energy combination in Qinghai
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Qinghai Salt Lake is planning to integrate the local photovoltaic power, photo-thermal power and wind power in Golmud region to set up company scale micro-grid. With technology innovation, to achieve direct application of solar power to the electrolysis DC power supply system, so as to secure a powerful, stable and reliable power supply.
Advanced bischofite direct electrolysis process
---- Technology support for “Green Mg”

Production process

1) Proven technology with optimization, by-product Cl₂ as raw material of PVC production;

2) No need exploring and mining for raw materials, no large amount of wastes and dusts produced in the production phase. Minor amount of waste water containing chlorine will not cause negative effect to Salt Lake.
Advanced bischofite direct electrolysis process
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Production process

3) Pneumatic conveying system is applied to realize MgCl2 automatic feeding for large-scale magnesium electrolysis cell.

4) Advanced protective gas system, minimize the negative impact to the working condition as well as the environment.
5) Cooperation with Magontec to produce various Magnesium alloys directly using Mg melt.
6) Low carbon emission. No carbon containing raw material, no carbon producing electrolysis process and green energy with further improvement by direct applying solar power.
Advanced bischofite direct electrolysis process
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Current project progress

The construction has been finished, and whole process commissioning completed, trial load of dehydrated MgCl₂, pure Mg, Mg alloy as well as Mg diecast part had been produced.

- On 31 Dec. 2016, MgCl₂ dehydration process finished commission;
- In Jan. 2017, pure Mg was produced. 30kmt Mg capacity is expected to reach in 2017, together with continuous equipment optimization.
MgCl₂ dehydration unit

Magnesium Electrolysis workshop

Magnesium alloy ingot casting

**Mg facilities**

- **Brine purification:**
  Commissioning at the end of 2015 at achieved designed capacity. $\text{SO}_4^{2-} < 15\text{ppm}$, B complete removal;

- **Dehydration unit:**
  Commissioning whole process at the end of 2016. MgCl₂ content $>96\%$, Mg(OH)Cl $<0.4\%$.

- **Electrolysis cell:**
  Commissioning on June 2016. Trial production continues with 2-3mt pure Mg output. More cells are in preparation for operation.
Ancillary facilities

- **Sodium carbonate:**
  Commissioning in 2014, 180kmt and over 300kmt production achieved in 2015 and 2016 respectively.

- **PVC:**
  Commissioning in 2016, and now in steady operation.

- **Coke:**
  Commissioning in 2016, and now in steady operation.

- **DMTO and PP:**
  Construction finished and commissioning planned in 2017.

- **Methyl alcohol:**
  Construction finished in 2016 and in commissioning.

- **Potash:**
  Commissioning in 2016 and now in optimization.

- **Coal washing:**
  Commissioning in 2015, and now in steady operation.
Advanced bischofite direct electrolysis process
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Visions of Qinghai Salt Lake green Mg

- With innovation-driven strategy, to develop ecological friendly Mg-Li-K park;
- Preparation of second stage expansion at proper time for million mt capacity, to lead the Mg industry;
- To build world class Mg material base, China Li metal base and world class K product base.
“Made in China 2025” and lightweight demand
---- Policy support for “Green Mg”

1. China’s “Made in China 2025” Strategy defines the lightweight of new energy cars as one of the key tasks.

(资料来源:新能源汽车网)
2. Lightweight demand of automotive industry welcomes Qinghai Salt Lake green Magnesium.

Chinese manufacturing industry is speeding up the development of low carbon green process and technologies. According to China’s Ministry of Industry’s requirement, Green Manufacturing must be implemented in the whole process and all industry sectors.

21 century increases environmental concerns globally. Lightweighting becomes critical demand in automotive, railways, aircrafts and other industries, particularly in the new energy vehicles.
2. Lightweight demand of automotive industry welcomes Qinghai Salt Lake green Magnesium.

Perfect timing and policies

The new energy vehicle plan in “Made in China 2025” strategy will accelerate the lightweight trend of automotive industry. This policy and trend becomes the perfect timing for Qinghai Salt Lake’s “Green Mg”.
“Made in China 2025” and lightweight demand
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2. Lightweight demand of automotive industry welcomes Qinghai Salt Lake green Magnesium.

Favorable resources and technology

Qinghai Salt Lake unique advantages on MgCl2 resources, clean energy, dry and oxygen-poor conditions are the solid ground of green Mg supply.
“Made in China 2025” and lightweight demand
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2. Lightweight demand of automotive industry welcomes Qinghai Salt Lake green Magnesium.

Cooperation network

Qinghai Salt Lake welcomes and is open to collaborate with all parties to enhance the technology development for new Mg alloys, new processes and new Mg alloy applications, through its collaborative innovation platform.
Thanks for your continuous concern and support to Qinghai Salt Lake Mg project, and welcome you all to visit us!
谢谢大家