

# China's reserves are staggering! Can combustible ice instead of Petroleum?

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In May 18th, China's natural gas hydrate in Shenhu Area in the South China Sea (also known as the "combustible ice") production to achieve a stable gas supply for 187 hours.

This is the first time for China to realize the production of combustible ice waters, "Chinese theory" "Chinese technology" and "Chinese equipment" which condenses outstanding achievements.

This achievement is of great significance to the promotion of energy security, the optimization of energy structure, and even to the change of the world energy supply pattern. The Central Committee sent a congratulatory message saying it was a historic breakthrough.

Why is flammable ice so important?

## 1

100 litres of combustible ice

Let the car run 50 thousand kilometers

Flammable ice, the scientific name of gas hydrate, is a kind of new energy with high efficiency, cleanness and great reserves. It is an ice like crystalline compound formed by natural gas and water under high pressure and low temperature.

In appearance, flammable ice is like white or light gray ice crystals. If there is a fire source, it can be ignited like solid alcohol, so it is called "flammable ice".



1 cubic meters of combustible ice can release about 0.8 cubic meters of water and 164 cubic meters of natural gas, and the energy produced by combustion is obviously higher than that of coal and petroleum.

For example, a car that uses natural gas as fuel can run 300 kilometers at a time plus 100 liters of natural gas. Then, with the same amount of combustible ice, the car can run 50 thousand kilometers.

At the same time, the combustible ice does not produce any residue or exhaust gas after combustion, thus avoiding the most troublesome pollution problem.

## 2

The combustible ice reserves in our country are amazing

Flammable ice is widely distributed in the global ocean, as well as below the ground frozen soil and Polar Regions.

The amount of combustible ice is small, but the energy contained in it is immeasurable. It is estimated that its amount of resources is equivalent to two times of the total carbon of the traditional fossil fuel.

Scientists call combustible ice "belonging to the future energy", and believe that it can meet the new energy used by mankind in 1000. It is the first choice for traditional energy sources such as oil, coal and so on.

"Bluewhale One" drilling platform on gas hydrate production operations (May 16th).



The South China Sea area is the most important distribution area of combustible ice in China, and the amount of combustible ice resources in China is about 1000 tons of oil equivalent, of which nearly 800 tons are in the South China sea.

The exploration revealed that the Shenhu area of 11 orebodies, an area of 128 square kilometers, resource storage capacity of 150 billion cubic meters, equivalent to 1.5 tons of oil reserves, "the successful production means that these reserves are expected to become the precious energy".

### **3**

Mining is difficult

How big is the technology?

Although the combustible ice reserves, wide distribution, but in the form of oil and natural gas than much later, it is generally cover the seabed strata sandy, seabed drilling equipment existing mining it is like "blacksmith, tofu with diamond embroidery", the slightest mistake will lead to a large number of sand poured into the pipeline, caused by mining failure.

And the early in the last century began in 60s compared to the exploration and study of combustible ice, combustible ice research in China started late in 1998, but China science and technology workers in less than 20 years to complete the whole process from blank to catch up.

China's sea area mainly belongs to the silt sand reservoir, the sand fine causes the permeability to be worse, simultaneously our country's flammable ice water is big, the reservoir buried shallowly, the construction is more difficult. The breakthrough of the combustible ice mining has more reference value for the whole world.

"Bluewhale one" drilling platform (May 16th photo).



- to tackle tough, depends on "the establishment of China theory". Based on many years of exploration and Research on the land of China, the first in the world to establish the "two type three" combustible ice metallogenic theory, guiding the delineation of the ore finding area, pinpoint the trial mining target; creation of combustible ice "three phase control" theory applied to the development of mining, mining simulation and test plan, ensure that the production process safety control.

- production success also depends on the "China technology breakthrough". Through this test, achieve a major breakthrough in the whole process of production of combustible ice core technology in China, formed a new international leading production process.

- test success, but also from the "China equipment support. The trial of the drilling platform "blue one" is our own manufacturing "powers", is the world's largest, drilling depth of the Shuangjing semi submersible drilling platform, can be applied to any global deep-sea operations, in the production process, our scientists also developed a large number of independent intellectual property the successful application of tools and implementation.

#### 4

Up, fly to the stars, the sea

Down and into the deep earth

From the "blue one" started the production of combustible ice, not only has important significance for China's future energy security, optimize the energy structure, and may even bring change to the world energy development pattern to succeed.

Test successfully broken China in energy exploration and development field with long-term running situation, made entirely of independent innovation theory, technology, engineering and equipment, realized in this field by the historic leap to lead to.

"Theoretically, the interior of the earth can be used in the spatial distribution of ore from the surface to 10 thousand meters underground, the depth of exploration and exploitation of the world's advanced level has reached 2500 meters to 4000 meters, while China is mostly less than 500 meters, is to enter the deep earth science and technology -- 2016 National Science and technology innovation conference put forward a conclusion that the problem" we must solve, let people full of longing for the land of the depths of the sea.

If China's solid mineral exploration depth of 2000 meters, proven reserves of resources can be doubled.

"Bluewhale one" drilling platform on gas hydrate production operations (May 16th).



The vast ocean polymetallic nodules, the total amount of resources is about 3 trillion tons, commercial exploitation potential of 750 tons; sea cobalt rich resources of cobalt crust is about 10 tons of rare earth resources; Pacific deep-sea sediments of 880 tons. In the future, 40% of the world's total oil and gas reserves will come from the deep sea.....

The ocean, especially the deep sea, is the strategic space and strategic resource, and its strategic position in national security and development is becoming increasingly prominent. Deep-sea exploration is a strategic need for the construction of a maritime power.

China ocean exploration innovation has made great progress, but in some depth compared with the United States and Japan and Russia and individual EU countries there is a gap to deep-sea, play the advantage, for the latecomer, this is the strategy of science and technology problems to be solved.

After this trial mining, China's combustible ice mining will enter a new stage of scientific accumulation.

On the basis of summing up the experience of production system, optimize production technology, will also carry out more kinds of production types of combustible ice, system development and utilization for the characteristics of China's resources, and create a national key laboratories, engineering technology center and innovation platform, further improve the combustible ice exploration and deep sea science and technology innovation ability.

In the "blue one" drilling platform, the staff to celebrate the success of natural gas hydrate production (May 16th).



According to the Ministry of land and resources of science and technology innovation plan, "13th Five-Year" period, through the development of deep sea oil and gas and combustible ice exploration and development technology and equipment, China will promote the ocean mineral exploration and marine engineering production of combustible ice, and strive to 2020 to achieve commercial production, full of deep sea diving and deep sea floating nuclear power technology development platform.