

## "Artificial sun" to light up our homes

*This article coincides with Russia's intention to mine moon tritium.*

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Creating an "artificial sun" to realize controlled nuclear fusion reaction has become a major temptation in today's world. Wouldn't it be an eternal act of kindness if the "artificial sun" could help solve human's energy shortage?

What is exciting is that seven parties including: China, the European Union, US, South Korea, Japan, Russia and India, have signed an agreement in Brussels on May 24 to launch the construction of the International Thermonuclear Experimental Reactor (ITER) in southern France. This signals related research on the project will be fully carried out. The dream of building an "artificial sun" will come true.

The ITER is the largest international collaborative research and development project, it aims to build a controlled nuclear fusion reactor and hopefully it could become commercially available.

According to the theories behind the atom and hydrogen bomb, both nuclear fission and fusion can produce huge quantities of energy, but one fusion reaction can release about 7 times more energy than the fission's. Using fusion to benefit people will be of great prospect.

As an element for fusion, hydrogen is the most abundant resource in universe, its fusion has been running for 5 billion years in the sun and it could burn at least another 5 billion years.

As deuterium and tritium- isotopes of the hydrogen are also common on other planets, deuterium proves to be an inexhaustible source of energy.

According to scientists' estimate there are 40 trillion tons of deuterium in sea water. After nuclear fusion, the deuterium extracted from one liter of sea water will produce as much energy as that of 300 liters of gasoline.

If all the deuterium and tritium were used in a fusion reaction, the energy released from the two is enough to provide human use for 10 billion years. Compared with fission, fusion is a safe, non- radioactive and cheap resource.

Based on previous research, the ITER project was proposed by the US and former Soviet Union in 1985, and joined in later by Japan and the EU. After the Soviet Union was dissolved, the US temporarily withdrew from the project in 1999. But research on the project did not cease. The US rejoined the ITER in 2003. Later, China, South Korea and India became joint sponsors.

After years of endeavor, participants of the project have not only finished all the negotiations, but also have decided to use Cadarache, in southern France as the site.

According to plan, construction of the ITER will begin this year and may last about 10 years. It will cost about 4.6 billion US dollars.

However, building an "artificial sun" is no easy task. Scientists have not figured out how to contain the 100 million degrees Celsius plasma released after fusion so that heat and pressure are maintained long enough and intensely enough to force ions to fuse, despite the decades of efforts that have been made. A number of technologies are still challenging scientists in the implementation of the project.

China became a formal member of the ITER in 2003. China's participation in the project will be of great significance for it to solve the energy shortage and help China to maintain a sustainable development.

As an explosion in the world population and energy crisis have begun to threaten the world, the unprecedented ITER project is perhaps an alternative way for human survival. Though quite far from us now, with some predicting it may take 50 to 100 years to be finished, we still believe the moment will come some day.