

Thorium Molten Salt Reactor (TMSR)

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1China successfully achieved the first-ever Thorium to Uranium fuel conversion in a Thorium Molten Salt Reactor (TMSR)

China's TMSR is currently the only operational molten-salt reactor in the world

The achievement of thorium-uranium conversion marks a milestone in TMSR development

About Thorium Molten Salt Reactor (TMSR)

It is fourth-generation advanced nuclear energy system that uses high-temperature molten salt as a coolant

Key Features: Cool without water, runatatmospheric pressure, deliver ahigh-temperature output, etc

Key Advantages:

oPassive Safety Features: If an MSR is too hot, a salt plug melts, stopping the reaction

o**Small High-Level Nuclear Waste Footprint**: Thorium generates fewer long-lived minor actinides (radioactive metallic elements) than plutonium fuels.

oOther: Extract more energy from fuel, etc

Thorium Fuel

Thorium has to be converted to Uranium-233 in a reactor before it can be used as fuel.

oThorium-232 is the only naturally occurring isotope of thorium.

It is three times more abundant in nature than uranium

oDespite its widespread availability, the metal's utilisation is restricted by its high extraction cost.

Thethird stage of India's nuclear power programenvisages large scale power production from thorium

oAdvanced Heavy Water Reactor, currently under development withBhabha Atomic Research Centre (BARC), would serve as a technology demonstrator for thorium fuel cycle.

oAlso, India is developing an Indian Molten Salt Breeder Reactor (IMSBR)

Thorium reserves in India

India has the world's largest reserves of thorium

Kerala and Odisha have rich reserves of **monazite**, which contains about 8-10% thorium.

It is also found in Andhra Pradesh. Tamil Nadu. West Bengal and Iharkhand

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