

Molten Hydroxide Containment

- For application in nuclear reactors

The Company

Seaborg Technologies is developing an advanced type of nuclear reactor called a molten salt reactor, which is fundamentally different from conventional nuclear reactors. The fuel is dissolved in a molten salt, which effectively retains radioactive elements and acts as the coolant at low pressure despite operating at high temperature. In short, this removes the risk of a meltdown.

Seaborg Technologies was founded in 2015 and now has around 30 employees, where most have strong technical backgrounds in physics, nuclear and mechanical engineering, and chemistry.

The University

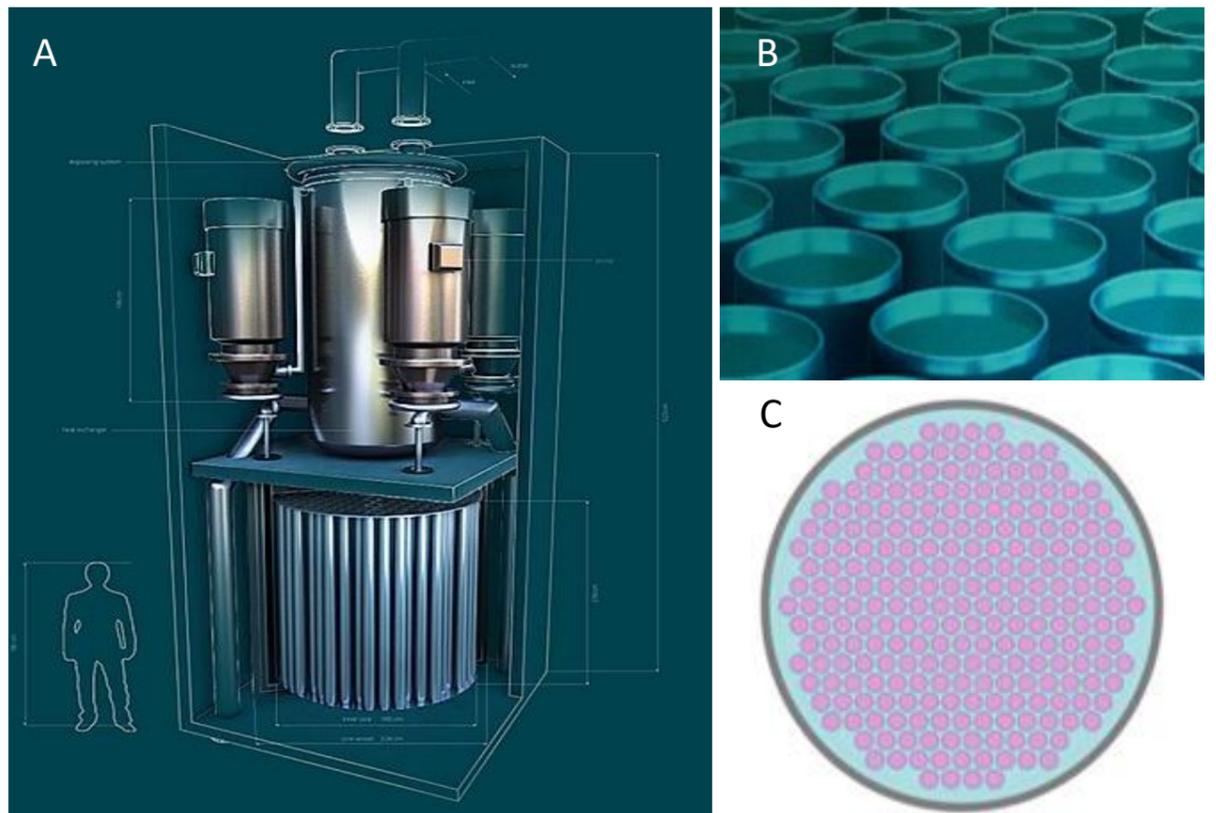
The project will be carried out primarily within the Materials and Surface Engineering section in the Mechanical Engineering Department at the Technical University of Denmark (DTU).

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The Project

In a nuclear reactor, the moderator is a material that slows down the fast neutrons produced from atoms splitting in the fissile compound. Slowing down the fast neutrons makes them more easily absorbed by fissile nuclei, which keeps the fission chain reaction going. Seaborg Technologies has patented the use of molten sodium hydroxide (NaOH) as a moderator for their reactor.

The aim of the project is to identify materials and control parameters that makes it possible to contain molten sodium hydroxide at 700 °C. Molten sodium hydroxide can be severely corrosive, but there are indications that its corrosivity can be hindered through a combination of materials chemistry and atmosphere control.



A) Illustration of the reactor core design (250 MW)

B) and C) Illustrations of the fuel tubes surrounded by the liquid moderator of sodium hydroxide

The Commercial Potential

Seaborg technologies' reactor can only get to market with a working moderator, thus suitable containment of molten sodium hydroxide is vital to the success of Seaborg Technologies.

The Research Contribution of the Project

The research that will be carried out for this project may be useful in other industries as well:

- Heat storage of solar power in molten salts
- Direct carbon fuel cells
- Extraction of minerals from their ore



Birgitte Stoffersen
Bibi@Seaborg.co