framatome

Press Release
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Framatome to start industrialization of Europe's first high-density monolithic nuclear fuel for research reactors

April 19, 2024 - Framatome and the Technical University of Munich (TUM) have signed a cooperation agreement to establish the industrialization process of molybdenum-uranium (U-Mo) monolithic fuel for the TUM-operated Forschungs-Neutronenquelle Heinz Maier-Leibnitz (FRM II) research reactor in Germany. This low-enriched fuel will benefit from the highest uranium fuel density ever realized in Europe for research reactor operations.

Framatome CERCA's Research & Innovation Laboratory (CRIL), in cooperation with TUM, developed the key steps of the manufacturing process for a high-quality U-Mo fuel, including the manufacturing of small-scale prototypes, established a qualification procedure, and installed a pilot line in its research facility in Romans (France). This innovative fuel will be key to the continued operation of the FRM II reactor in the long term, a reactor essential for understanding and interpreting the structure of matter and supplying neutrons to industry and the scientific community.

"We have been working on this project since 2019 and we are proud to celebrate this important milestone with our client." said François Gauché, Vice-President of CERCA at Framatome. "Our teams rose to the challenge of developing a high-tech fuel to meet the needs of research reactors and ensure their sustainability. We are now ready to take this to the next level and manufacture this innovative fuel. "

The FRM II research reactor currently uses highly enriched uranium fuel to generate a dense neutron flux for scientific experiments and the production of medical radioisotopes. Several years ago, TUM engaged in a program to explore the feasibility of a fuel based on low-enriched uranium while maintaining the excellent performance of the reactor. In 2019, TUM contracted Framatome to develop the U-Mo foils manufacturing technique to support the existing technology of embedded foils in a cladding of aluminum.

"FRM II and Framatome have been working since 2019 to set up a European production line for monolithic U-Mo fuel," says Prof. Dr. Christian Pfleiderer, Scientific Director of the FRM II. "The hard work of our teams has paid off. This new fuel is the guarantee for a reliable and sustainable supply of neutrons for research and innovation."

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The high uranium fuel density of Framatome's innovative monolithic U-Mo fuel allows the reactor to maintain its high level of performance with low enriched uranium. The first U-Mo foils were successfully manufactured in 2022 at CERCA. Irradiation of the first monolithic U-Mo fuel plate prototype is scheduled for late 2024.

FRM II is a world leading research reactor and neutron source. It is optimized for neutron scattering experiments at beam tubes and neutron guides. It has irradiation facilities that produce homogenously doped silicon for the renewable energy transition, and radioisotopes needed for medical diagnostics and cancer treatments.

Inaugurated in 2019, Framatome CERCA's CRIL, located in Romans-sur-Isère in France, is dedicated to developing uranium-based fuel for international research in physics and nuclear medicine.

François Gauché and Prof. Christian Pfleiderer signing the agreement. Also in the photo: (on the left) Cyrille Rontard, Dominique Geslin, Ralf Gathmann (Framatome) and (on the right) Dr. Bruno Baumeister and Robert Rieck (FRM II).

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About Framatome

Framatome is an international leader in nuclear energy recognized for its innovative, digital and value added solutions for the global nuclear fleet. With worldwide expertise and a proven track record for reliability and performance, the company designs, services and installs components, fuel, and instrumentation and control systems for nuclear power plants. Its more than 18,000 employees work every day to help Framatome's customers supply ever cleaner, safer and more economical low-carbon energy.

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Framatome is owned by the EDF Group (80.5%) and Mitsubishi Heavy Industries (MHI – 19.5%).

About Forschungs-Neutronenquelle Heinz-Maier-Leibnitz

The Forschungs-Neutronenquelle Heinz-Maier-Leibnitz provides neutron beams for scientific experiments as well as for industry and medicine. The FRM II is operated by the Technical University of Munich and funded by the Bavarian State Ministry of Science and the Arts. Approximately 1200 visiting scientists use the neutrons at the FRM II per year.
More information at www.frm2.tum.de, X, LinkedIn, Instagram and YouTube.

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