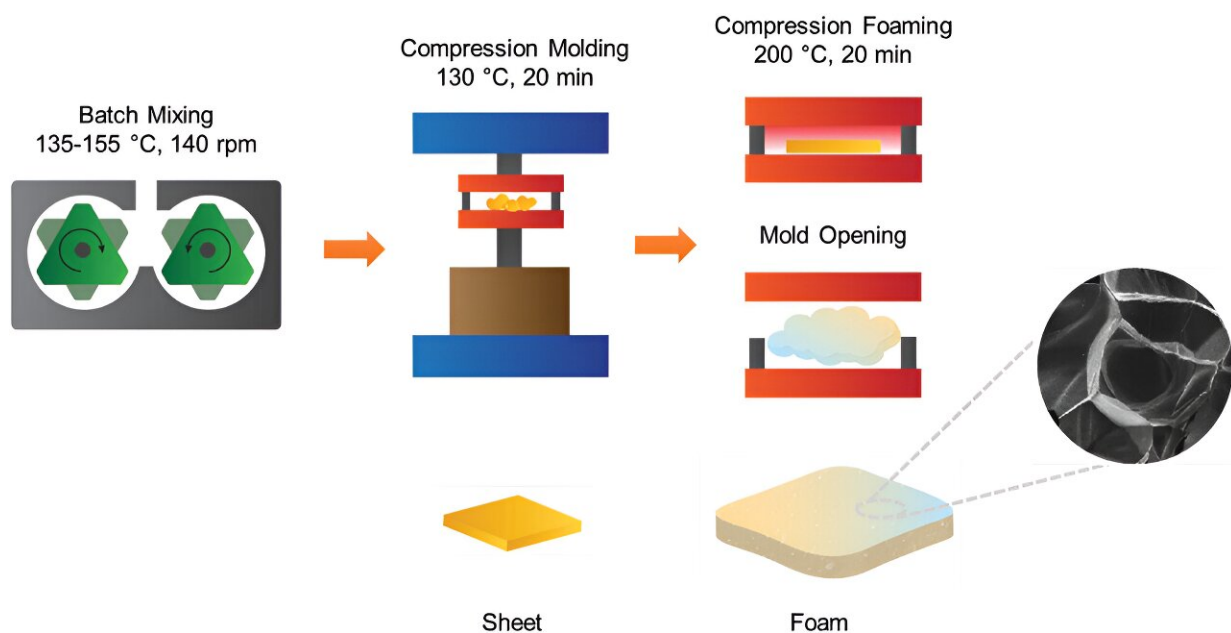


Polymer foam aims to transform oil spill cleanup

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Schematic procedure for foam fabrication via compression foaming. Credit: *Macromolecular Rapid Communications* (2024). DOI: 10.1002/marc.202400232

University of Waterloo researchers have developed a new material that can absorb more than eight times its weight in oil, offering a new solution in preventing groundwater contamination from spills or accidents. The study, "Fabrication of Triblock Elastomer Foams and Gelation Studies for Oil Spill Remediation," was [published](#) in *Macromolecular Rapid Communications*.

"The current technology for oil capture is lagging," said Tizazu Mekonnen, a professor at Waterloo's Department of Chemical Engineering. "Preserving our environment is crucial, which is why developing advanced technologies like this polymer is essential for remediating future groundwater contaminants that involve oil."

The polymer foam—formally known as a tri-block polymer styrene-ethylene-butylene-styrene (SEBS)—that Mekonnen's group designed turns into a gel upon contact with oil, that prevents [groundwater contamination](#).

This polymer could be used in practical settings for electric transformers and oil storage facilities that face groundwater leak risks due to unexpected accidents or [natural disasters](#) such as tornadoes, earthquakes, and hurricanes. The Waterloo team worked with Ontario-based manufacturer Albarrie Canada who provided financial and technical support for the project.

To determine which polymer would work best for oil absorption, Mekonnen and his team measured various gel densities, tested its [mechanical properties](#) and capacity to hold as much liquid as possible without becoming saturated. Each polymer foam is designed to allow water to freely pass through its porous structure but triggers a chemical reaction once it comes in contact with oil.

The polymer that the Waterloo researchers developed was found to resemble a yoga mat's spongy texture but becomes a semi-solid gel-like substance that seals oil in and prevents leaks. The material is also lightweight, easy to transport, and oil trapped in the gel can be completely recovered through a secondary process.

The polymer also solves an issue that other materials used to combat [oil spills](#) in groundwater or ocean remediation encounter, such as further

contamination due to an over-saturated material or oil leakage once it is removed from the water.

"This innovation has the potential to protect both marine and [terrestrial ecosystems](#), ensuring a cleaner environment for wildlife and humans alike. The impact of this [polymer](#) extends beyond immediate spill response, offering a sustainable solution for long-term [environmental remediation](#)," said Mekonnen.

Going forward, Mekonnen and his research team will work alongside industry partner Albarrie Canada to apply their research to the company's transformer oil containment services where larger volumes of oil spills will be examined.

More information: Hyejin Lee et al, Fabrication of Triblock Elastomer Foams and Gelation Studies for Oil Spill Remediation, *Macromolecular Rapid Communications* (2024). [DOI: 10.1002/marc.202400232](#)

Provided by University of Waterloo

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