INTERNATIONAL CLEANUP CONFERENCE ADELAIDE 2024

crc care

MEDIA RELEASE

Monday 16 September

Researchers use ultrasound technology to destroy toxic 'forever chemicals'

The persistence of per- and polyfluoroalkyl substances (PFAS) in soil and water has resulted in growing concerns about their environmental and health risks, prompting the development of new technologies to degrade this group of chemicals.

While efforts are being made to reduce PFAS exposure, the 'forever chemicals' are still common components of firefighting foams used to extinguish flammable liquid fires. These foams, known as aqueous film-forming foam (AFFF), are used in various settings, including airports and industrial sites, where they can leach PFAS into the environment.

PFAS can be separated from contaminated samples using a technique called foam fractionation, however, this only isolates and removes the PFAS but does not destroy them.

Researchers from the Global Centre for Environmental Remediation (GCER) and CRC for Contamination Assessment and Remediation of the Environment (crcCARE) at the University of Newcastle have used ultrasound technology to break down PFAS with extremely high efficiency. This ultrasonication creates tiny pockets of heat that generate reactive radicals, which can attack and break down the PFAS.

University of Newcastle PhD student Mr Olalekan Simon Awoyemi is one of the lead researchers in the project.

'The ultrasound waves propagate through the solution, generating tiny bubbles. The bubbles grow bigger and bigger until they reach a critical size and implode. Under these conditions, the temperature reaches 5000 degrees Kelvin [approximately 4,700 °C] and 1000 atmospheres of pressure,' said Mr Awoyemi.

'These conditions are enough to pyrolyze PFAS and dissociate water vapor, generating hydroxyl radicals, which further break down PFAS.'

Using ultrasound to degrade PFAS from foam fractionation, these researchers were able to achieve a 97% reduction in PFAS levels. This study was the first to propose a combination of foam fractionation and ultrasound techniques to degrade PFAS.

'Some of the benefits of this hybrid technique are that it's safe to handle and doesn't require chemicals, so it's more environmentally friendly,' said Mr Awoyemi.

Distinguished Laureate Professor Ravi Naidu, Managing Director and CEO of crcCARE, is a supervisor on the project.

'This innovative use of ultrasound to degrade PFAS-enriched foam of foam fractionation represents a breakthrough in the way we approach PFAS contamination. It opens the door to broader applications, potentially addressing a wide range of chemical pollutants in the future,' said Professor Naidu.

crcCARE is hosting CleanUp 2024 – the 10th International Contaminated Site Remediation Conference incorporating the 4th International PFAS Conference – in Adelaide from 18 to 16 September. crcCARE is a partnership of organisations dedicated to developing new ways of dealing with and preventing contamination of soil, water and air.

The conference program is available at: https://adelaide2024cleanupconference.com/program

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Presentation: Olalekan Simon Awoyemi, Poster presentation, Monday – Wednesday

Media*:* Accredited media representatives are welcome to attend. Complimentary media passes are available for any media personnel who wish to attend the conference in person.