Supercritical Water Oxidation (SCWO)

374water

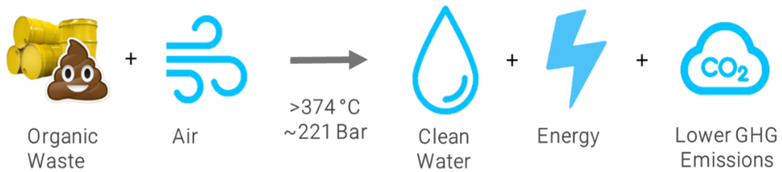
Destruction of PFAS contaminated municipal sludge

The Problem

- Environmental pollution is costing society billions of dollars every year.
- Sewage treatment plants generate millions of tons of sludge, release pathogens, pharmaceuticals or persistent chemicals such as PFAS. These contaminants are limiting reuse and driving up treatment and disposal costs.
- 4.5 billion people lack access to safely managed sanitation and clean water. Decentralized treatment is the only viable option to solve the sanitation crisis.
- Worldwide industry generates billions of tons of toxic wastes. Transport offsite and disposal is hazardous and expensive.

What is SCWO?

- SCWO is an advanced oxidation technology very effective at treating concentrated wet waste.
- It renders wastewater sludge, biosolids and highly concentrated industrial wastes into clean water, reusable energy, and inert gases and solids.
- SCWO utilizes the unique properties of water above its critical point (374 C and 221 bar) to rapidly convert organic waste to clean water, inert solids and gases, and reusable heat with >99% reduction in solids volume.



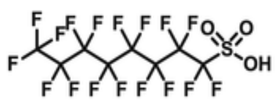
- The system has been successfully demonstrated at scale in >100 runs and thousand hours of operation.
- The system is modular and prefabricated, so it can be cost effectively shipped, installed and operated onsite within the footprint of an existing site.

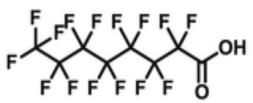
374Water Inc

- 374Water is a social impact, cleantech company spun off Duke University and based in Durham, NC.
- It is commercializing a novel approach to supercritical water oxidation packaged in prefabricated modular systems for on-site waste processing.

SCWO Destroy Persistent Chemicals

- Per- and polyfluoroalkyl Substances (PFAS) is a group of man-made chemicals that includes PFOA, PFOS, and others.





- They originate from manufacturing and processing facilities, airports and military installations that use firefighting foams.
- Persistent in the environment and in the human body
- Can lead to increased cholesterol levels, low infant birth weights, effects on the immune system, cancer (for PFOA), and thyroid hormone disruption (for PFOS).

Case Study

Client: Small Scale Municipality

Location: Maine, USA

Application Type: Lime stabilized Sludge Contaminated with PFAS

Pollutant	Influent	Effluent
PFOS	110,000 ng/l	0.65 ng/l
PFOA	<6200 ng/l	3.15 ng/l
PFAS (24 derivatives)		29.1 ng/l

99.95% PFAS destruction

- The SCWO system effectively treated contaminated sludge and destroyed PFAS below the regulatory limits. Treatment was stable, reliable and effective. There were no signs of enhanced corrosion.

Nix Treatment Systems

- Mass produced, prefabricated, containerized system

Model	Daily Capacity Nominal (wet tonne)	Cost (USD)
Nix6	5.1	$2M
Nix30	25.5	$4.5M
Nix200	170	$17.2M

The Future

- SCWO is a disruptive and proven technology with the potential to shift the global waste treatment paradigm toward one that supports the United Nations Sustainable Development Goals (SDGs).

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