

Integrated Water Recycling and Repurposing System

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Vision

This technology offers a new concept to mitigate secondary contamination of wastewater treatment process and achieve water circularity through multi-physics approach.

Issue to solve

Sludge generation by coagulation and biological processes, and chemical input for membrane regeneration have been barriers to further improve efficiency and reduce carbon footprint in wastewater treatment sector.

Technology features

- Non-chemical and non-biological process.
- Self-cleaning and regeneration of functional modules.
- Flexible configuration to adapt to varying water conditions.
- Currently TRL 5 with prototype available.

Possible implementation

The team currently has a prototype combining electrochemical advance oxidation process (EAOP), commercial nanobubble generation and ceramic membranes. This technology is suitable for removing particulate, organic and microbial pollutants in wastewaters, and enables a sustainable close-loop solution to support emerging urban manufacturing.

The technology could be potentially used in:

- Aquaculture and urban farming to improve the water recirculation and reuse efficiency through mitigating debris, reducing the accumulation of toxic substances, and improving dissolved oxygen. E.g., water management in land-based recirculating aquaculture system (RAS), which has 15.3% GACR and will reach market size of US\$ 32.2 B by 2027.
- Domestic wastewater treatment to offer decentralized and self-sustaining treatment system on water recycling, such as in hotels, communities, etc.

Moving forward, the team is looking to create a platform solution where various functional modules can be developed to be incorporated or retrofitted into current infrastructure to address emerging needs in water circularity. The team is also seeking co-development and licensing partners to commercialize this technology.