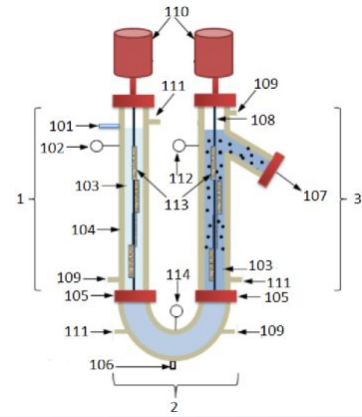




GRANTED

(IN461479)

A process and an apparatus for continuous freeze crystallization



NEED

Traditional desalination systems consume excessive energy and fail in extreme conditions, leading to 40% downtime in remote or disaster-hit areas. Nutrient-rich liquids also degrade when heat-based methods are used. But what if there was a way to purify water without heat or chemical additives?

TECHNOLOGY OVERVIEW

This patented U-shaped freeze crystallization apparatus continuously cools, chills, and freezes water or solute-rich fluids in a single tube. Using staged temperature zones (5 to -13°C) and rotating scrapers, it extracts purified ice for clean water or concentrated liquids—without heat, membranes, or chemicals.

TECHNOLOGY KEY FEATURES

One-step freeze crystallization using a compact U-tube, temperature-zoned design (-13°C to 15°C), and rotating scraper blades (20–100 rpm). Enables continuous purification of water and liquid foods without chemical or thermal stress.

[Read more here](#)

MARKET ANALYSIS

Global freeze crystallization market is projected to grow at 7.1% CAGR till 2033 due to rising demand for sustainable water recovery and nutrient preservation. India's water purification market is growing at 10.2% CAGR (IMARC, 2023) driven by industrial wastewater regulations and food-grade processing needs.

Target Industries

Water Tech OEMs and/or Food and Beverage Concentration Platform Integrators and/or Industrial Effluent Management Service Providers in pharmaceuticals, juice processing, and coastal desalination

AT A GLANCE

- SDG 6 (Clean Water and Sanitation), SDG 9 (Industry, Innovation and Infrastructure), SDG 12 (Responsible Consumption and Production)

Technology is available for licensing/ co-development.

Reach out to Prof. Deepak Chitkara, Coordinator, BITS Technology Enabling Centre,

BITS Pilani Contact Details: tec.bits@pilani.bits-pilani.ac.in, 91 1596-255913

