



Zero Waste Water Capacitive Deionization

OTT-1592

APPLICATIONS

Drinking water treatments, Analytical laboratory, Health care (Hospitals and Dental Clinics), Pharmaceutical laboratory etc.

TARGET PROBLEMS

- ❖ Heavy metal contamination in drinking or potable water is a major public health concern due to its toxic nature.
- ❖ Majority of the techniques available not only remove unwanted heavy metal ions (Cu, Pb, Cd etc..) but also end up removing healthy metal ions (such as Ca^{2+} , Mg^{2+}) in the process.

FEATURES AND BENEFITS

- ❖ **Low Cost** – Low energy consumption
- ❖ **Improved Performance**- Selective high removal of heavy metal ions (Pb^{2+}) against healthy ions such as Ca^{2+} , Mg^{2+} etc.
- ❖ **Healthy Water Standards** - Minimal associated extraction to maintain optimal concentration of healthy ions without affecting taste or odor of the tap water
- ❖ **Zero Waste Discharge Technology** - Retrofit to existing pipelines and easy collection of lead precipitate using filters with zero waste water generation

TECHNOLOGY

Inventors at UW-Milwaukee (UWM) have developed a technology based on capacitive deionization (CDI) that selectively removes lead (Pb^{2+}) from tap water in a single pass mode with zero wastewater emission. This filtration system uses custom made electrodes that allow minimal removal of associated healthy ions (Ca^{2+} and Mg^{2+}), leaving water safe and healthy for consumption from every tap.

Heavy metal contamination in drinking or potable water is a major concern for human health due to its toxic nature. Many techniques are available in the market that can be effectively used to remove heavy metal ions from the water. These methods not only remove unwanted metal ions like Cu, Pb, Cd etc., but also end up removing healthy metal ions (such as Ca^{2+} , Mg^{2+}) in the process. CDI is a water purifying technique that has been less explored in heavy metal ion removal compared to other traditional methods. Additionally, CDI offers many advantages over other water-purifying techniques (e.g., reverse osmosis, RO) such as low life-cycle cost, high water recovery rate and low energy consumption.

The test results have shown that the natural presence of phosphate ions in the tap water enable lead to form a particulate rather than moving as free ion in the water in the presence of the composite CDI electrode developed by UWM inventors. The precipitate can be collected using filters equipped in the pipeline, thereby leading to zero-wastewater generation during the process.



INTELLECTUAL PROPERTY

Provisional Patent Application (PPA) filed April 2019

This technology is part of ongoing research program and is seeking partners for further development of prototype and testing to demonstrate effective removal of heavy metal ions from drinking water. It is available for developmental research support and/or licensing under either exclusive or non-exclusive terms.

INVENTOR(S)

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