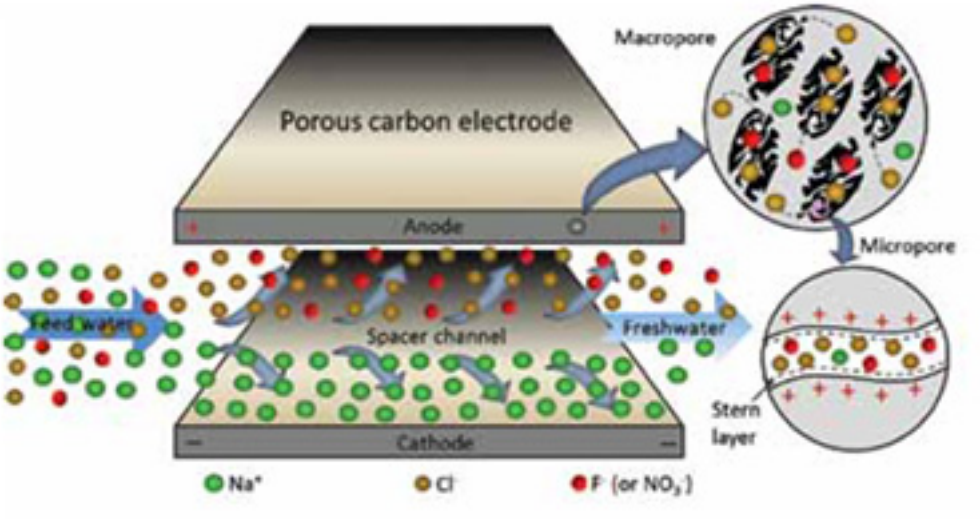
Water Water Everywhere and Every Drop to Drink

Low-energy, solar-powered desalination for agricultural, rural and remote applications is close to being a reality

Contaminants such as arsenic, nitrate, fluoride and salt are present in much of the groundwater used to supply remote communities in Australia, China, India and many other places deprived of frequent, fresh
rainfall. Such contaminants must be removed before this water is fit for human (or even animal or plant) consumption, but low cost, robust, sustainable technologies for doing this are few and far between.



Until now…

Researchers from the UNSW's Water Research Centre, Dr Peter Kovalsky and Professor David Waite, with input from doctoral student Wangwang Tang have, for some years, been refining desalination technologies based on the use of electrochemistry, including capacitive deionisation (CDI).

This technique is a low-energy technology that involves attracting charged ions to electrodes of opposite charge (sodium to the cathode; and arsenic, nitrate, fluoride and chloride to the anode). "Basically the technique sucks salt up like a sponge and results in treated water with much reduced concentrations of contaminants," explains Dr Kovalsky.

Having progressed in leaps and bounds, their research has attracted the attention of Mincarb, an Australian company specialising in electrochemical water treatment, and

resulted in a high impact Linkage Project research collaboration funded by the Australian Research Council.

Drawing on the strengths of a team whose specialties span water chemistry, chemical processes and electrical engineering, as well as the valued input of Mincarb, Dr Kovalsky, with Professor Waite, is hoping it shouldn't be too long before their product is on the market and solving contaminated water issues across the globe

This project aims to identify applications where CDI could cost-effectively make brackish, contaminated water usable, and then optimise CDI design and operating conditions to remove particular ions of concern, and to develop approaches to energy recovery.

"We anticipate the main outcome will be the development of a photovoltaic-powered CDI unit that is capable of stand-alone operation. It will have optimal energy recovery, inbuilt monitoring, control technology and will enable a cost-effective and fully sustainable operation," says Dr Kovalsky. "We already have a couple of good prototypes and together with Mincarb we will be looking to further develop and commercialise it."