Novel Brine Water-Graphene Based Energy Generation: Engineering the Endless Cycle

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Due to the current drought in California, many new desalination plants are being constructed, which fail in that they release water and air pollution, while providing no solution as to where the leftover concentrated salt water, or brine water, should be returned. The objective for this experiment was to determine if 3D printed graphene designs could effectively be used in a new way to harness electricity from the leftover brine water, serving as an alternative energy source to run the plant and forming an "endless cycle" of clean water and power. To begin, two graphene designs were drafted using CAD software, then printed. One test was run to determine the ideal thickness of the design, which was found to be 1 millimeter. These two final designs were then hooked up to a multimeter and tested for voltage, current, and power under varying circumstances such as differences between speed of poured brine solution, concentration of solution, as well as type of design. It was concluded that the ideal scenario for maximum energy should consist of a fast moving 5% brine solution poured over a 1 mm thick, 3 inch long, "V"-shaped design, in which around 7-8 volts of electricity or 2 watts could be generated. The results from this experiment prove that the designs are highly successful and demonstrate as much voltage capacity as five AA batteries, enough to power a small light bulb. The designs also performed extraordinarily in ocean water as well, leading to the idea that wrapping printed graphene filament around structures such as oil rig support beams, docks, hulls of boats, and the insides of pipes could easily harness the salt water energy generated from the naturally moving tides, allowing it to be brought back for use to the people living on or nearby the structures.

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