Superconductive Hybrid Desalination

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Water resources scarcity is central problem in Egypt and when it comes to human health, it must be our top priority. According to the UN (20091), 1,164,000 of the total Egyptian population don't have access to clean water and the gap between production and demand is 20 BCM/y. Seawater is the most sustainable source, and research reported that membrane desalination is the most efficient technique but it has drawbacks, such as the life time and enormous electric energy consumption. These are the shortcomings we have tried to overcome through this project. To increase life time of membrane, we used powerful Nano magnetite to modify surface morphology making it smoother. After studying the problem of energy consumption in reverse osmosis (RO) systems, we found that this is due to the high pressure required. Our solution applied the principle of superconductors to eliminate energy lost in pressure pumps. The results were spectacularly impressing as membrane efficiency in salt rejection reached 92.21% and flux was higher than ordinary membranes by 15.57%. By superconductors, we could maximize the power of pump as current goes to infinity. The amount of energy lost has decreased and by comparing initial cost to long-term cost, the total cost has decreased proving great success for our project.

Awards Won:
Fourth Award of $500