



**Wolfson Department of Chemical Engineering Special Seminar
Room #108, Wolfson Department of Chemical Engineering,
Wednesday July 31st at 2 pm**

Marina Lisitsin-Shmulevsky

Ph.D. Student (Advisors: Prof. Hasson and Prof. Semiat)

Chemical Engineering, Technion

Development of hybrid high recovery MSF desalination process

The multistage flash (MSF) process is a robust system able to cope much better than membrane desalination processes for water recovery from contaminated saline feeds. Currently the application of MSF is limited by its high energy consumption and low recovery level which is less than 50% (concentration factor <2) due to calcium sulfate precipitation concern. The energy consumption of MSF can be dramatically reduced by increasing its recovery level up to 75% (concentration factor 4). The high recovery MSF process can open a door for wide application of thermal desalination in treating contaminated saline wastes such as produced water.

The objective of this work was development of a high efficiency MSF process in which the high recovery level is achieved by removal of a major portion of the calcium ions from the feed water. The present study examined the proposed high recovery concept on sea water composition.

Two routes are examined for the pretreatment: electrolytic removal of the calcium ions and Donnan dialysis separation of calcium ions. Experimental results done using Donnan dialysis effect outlined the potential and limitation of this technique.

A single stage MSF pilot system was constructed to examine operational limits of a seawater feed from which 80% of the calcium ions were removed in a long term runs. Experimental results indicated the feasibility of MSF design to a concentration factor as high as 4 and a top brine temperature as high as 140°C. The economic benefits rendered by these results will be analyzed.

Refreshments will be served at 1:45 pm