

Contact: Frank Leitz, (303) 445-2255

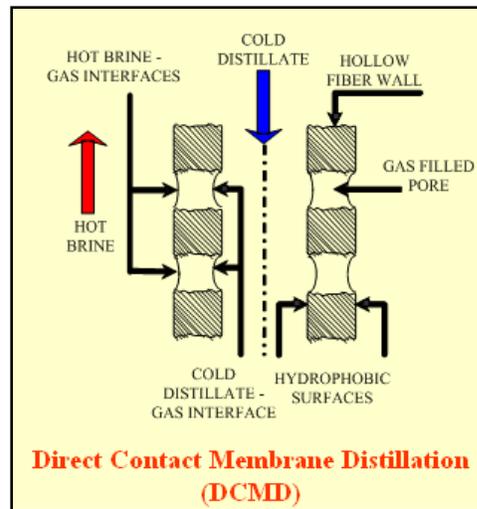
Desalting and Water Purification Research Program

Pilot-Scale Studies for Direct Contact Membrane Distillation-based Desalination

DWPR Report #134,
K. Sirkar, NJIT

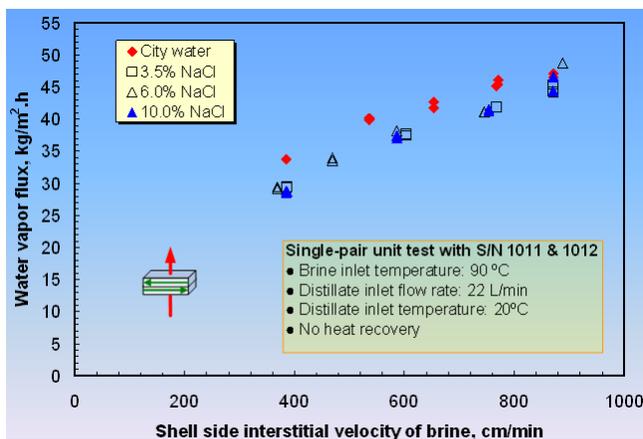
Background:

Direct Contact Membrane Distillation (DCMD) uses the difference in temperature and vapor pressure across a membrane surface to drive the desalination process. A hydrophobic porous hollow fiber membrane is used in the process. Cold distillate flows inside the fiber with hot brine on the outside transverse to the fibers.



The advantage of DCMD over reverse osmosis is that DCMD requires only sufficient pressure to move water through the system. The vapor pressure difference depends on the initial brine temperature. Effective productivity can be obtained between 70 and 90° C. Distillate must be cooled to create the temperature difference across the membrane.

Since the system is not pressurized, capital costs are lower and fouling may not be as difficult to remove as with high pressure systems. Objectives were:



- To evaluate hydrophobic coating which prevents pore wetting;
- To use cross flow module to enhance brine side heat transfer, reduce temperature polarization and thereby increase water vapor flux across the membrane.
- To optimize fiber wall thickness and bore size to reduce heat loss and pressure drop through the systems.
- To incorporate polymeric fiber heat exchangers.

