



# Research & Development Program

New York State Pollution Prevention Institute

## Antifouling Membranes for Wastewater Reuse

This technology has the potential to improve current commercial water filtration membranes by reducing effects of fouling.

**Keywords:** hydrophilic, antifouling, membrane fouling, wastewater reuse, zwitterions, dopamine, sulfobetaine methacrylate (SMBA)

### Process Implementation Readiness



#### Background and Technology Description

There has been much research on how to minimize fouling of membranes used to separate out clean water (ultrafiltration, nanofiltration, reverse osmosis). The focus of this project has been on hydrophilic coatings on the membrane surface that helps reduce organic material sticking/fouling of the membrane surface and pores.

Most attempts at creating hydrophilic layers on a membrane are multistep in nature. This research conducted at the University at Buffalo Chemical and Biological Engineering Department discovered a well-controlled, single step procedure to create a hydrophilic surface on fully manufactured membrane modules. Dopamine and sulfobetaine methacrylate (SMBA) in the correct ratios are able to form a bonded hydrophilic layer on different

membrane material types: PES (polyethersulfone), PAN (polyacrylonitrile), and PS (polysulfone). The figure shows the improvement in membrane flux for a treated nanofiltration membrane module over time using wastewater from Perry's Ice Cream in Akron, NY. The water tested on the membranes was after on-site wastewater treatment. The membrane used was a commercial nanofilter, M-N2540A9, made by Applied Membranes.

#### Technology Benefits and Value

- Provide facile, single-step post-modification of membranes and modules to increase hydrophilicity
- Maintain high permeate flow for longer times before fouling, thus allowing for more cost-effective application of membranes for wastewater reuse

#### Target Customers

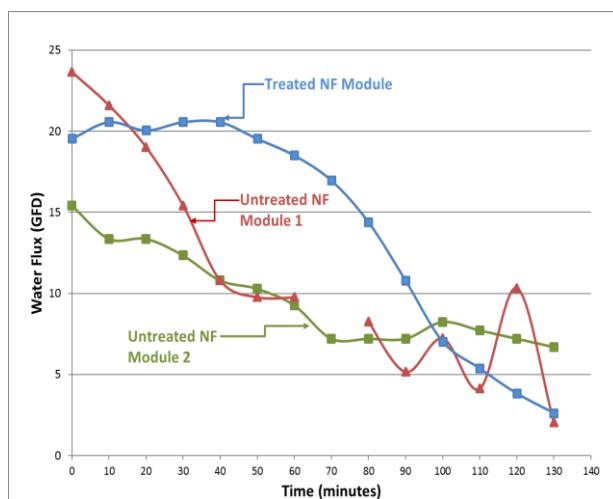
Manufacturers of RO, UF, and NF membranes and membrane system manufacturers.

#### Intellectual Property

This process is not under any patent.

#### Opportunity

NYSP2I is interested in working with qualified parties for product development of this technology.



**Dr. Eugene Park, Assistant Technical Director [www.nysp2i.org](http://www.nysp2i.org) 585.475.2512**

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