S1.5.3 PolyCera: A Novel Ultrafiltration Membrane for Reclaimed Wastewater Applications

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Municipal and industrial water and wastewater treatment is a rapidly growing market. Increasingly stringent regulations for direct non-potable reuse and safe environmental discharge continue to drive market demand for technologies to produce a high quality effluent. Reclaimed wastewaters free of toxins and biological contaminants can be reused for applications from upstream industrial processes to food-crop irrigation, which lower fresh water demand and can provide savings in operating costs. Dynamic feed qualities commonly found in these wastewaters quickly foul conventional materials, requiring frequent chemical cleaning, curtailing membrane performance and shortening product lifetime.

In response, Water Planet, Inc has developed a high performance ultrafiltration membrane for secondary effluent wastewater treatment that combines the advantages of ceramic and polymeric membrane materials. Derived from novel nano-structured polymeric materials, PolyCera membranes provide ceramic-like thermal, mechanical and chemical robust properties, while exploiting the high packing densities, scalable manufacturing and favorable economics of polymeric form factors. Having the ability to withstand continuous operation at pH 1 – 13 and temperatures as high as 80°C, PolyCera tolerates dynamic feed qualities where most polymeric membranes quickly foul. PolyCera spiral monolith have demonstrated glass-like hydrophilicity, higher operating fluxes, infrequent cleaning cycles, higher flux recovery, extended lifetime and smaller pore diameters when compared with conventional PVDF membranes.

In this presentation, PolyCera treated domestic secondary effluent wastewater to a level safe for human contact. This testing demonstrated how PolyCera membranes performed in comparison to PVDF of similar molecular weight cutoff. Moreover, the successful treatment of high organic loading and solids presence in feed waters indicates that PolyCera is a promising solution for municipal and industrial membrane bioreactor applications.