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Characterizing Polyamide RO Membrane Performance and Durability When Treating High pH Feeds

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Improvements to the construction and chemistry of the recent generation of polyamide RO membranes have resulted in improved salt rejection and higher water permeabilities. These same improvements have also enhanced the overall durability of the membrane. Specifically, current chemistries have demonstrated a greater tolerance for high pH operation. Because the characteristics of membranes operating at an elevated pH are different relative to the more commonly treated neutral pH feeds, studies were performed in the lab and in the field to characterize the performance and durability of the spiral wound RO membrane at high pH.

Studies were conducted in the laboratory to characterize ion passage and durability. The laboratory studies involved both cell testing of membrane samples and full size element testing. The passage of different ions, including boron, silica, sodium, and chloride was analyzed at different pH levels. The membrane's mechanical strength and glue peel strength were also tested in the lab to determine acceptable pH limits.

Data from actual RO systems operating at high pH confirm what was found in the laboratory. The passage of various ions through the RO system matched the ion passage as tested in the lab. As for the element durability, in systems operating for up to three years at elevated pH, the performance of the membrane was shown to be stable. The mechanical integrity of the element was also shown to be good.

Bio

Mr. Franks currently manages the RO/NF applications and technical support departments at Hydranautics. His primary responsibilities include evaluation of new and existing RO/NF membranes, managing membrane pilot studies, technical support for the operation and design of membrane systems, and maintenance and development of computer models for predicting and normalizing RO systems.