

Ionomr

The World's Most Advanced Polymer Materials

Details Of the Demo / Pilot

Location: Australia, Canada

Industry: Mining and Heavy Industrial Wastewater Treatment

Applications: Value added wastewater treatment, chemical generation

Parameters Monitored: Acid stability, robustness, acid recovery efficiency, electrical resistance, recovered acid concentration, radiolytic stability, thickness specific area resistance, Young's Modulus, chemical stability, IEC, cation permeability

Influent: Dilute acid waste streams contaminated with heavy metals; Oil field produced water.

Effluent: Concentrated sulfuric acid various metals; Desalted water acid, caustic

Our Compelling Value Proposition

Acid recovery requires membranes that offer stability at a wide range of pH and concentration of acids and metals, as well as high faradaic efficiency.

Ionomr membranes can operate in both strong acid and strong base, and are extremely strong and conductive enabling thin, low resistance membranes that make high TDS industrial applications feasible.

Membrane	Acid Stability	Robustness	Acid Recovery Efficiency	Electrical Resistance	Recovered Acid Concentration	Radiolytic Stability
IONOMR Aemion	High	Good	>95%	Low	>100 g/L	Good
Fumasep FAB	High	Good	89%	High	70 g/L	Fair
GE AR103	High	Excellent	>95%	Med	>100 g/L	Good
GE AZ103	High	Excellent	85%	Low	90 g/L	Fair
MEGA AX	Good	Excellent	74%	High	50 g/L	Poor
HAM	High	Good	89%	Med	90 g/L	Fair
AGC Selemion	High	Good	>95%	Low	120 g/L	Good



The Results

Highlights in Mining and Hydrometallurgy Applications (sulphuric acid recovery and concentration):

- No degradation evidenced concentrating to 1M H₂SO₄, including disassembly and integration into multiple pilot stacks
- Highest recovery efficiency (>95%) and acid concentration (>100 g/L) with lowest electrical resistance
- High radiolytic stability in uranium recovery application Aemion™ advanced to full scale evaluation for project installation.

Highlights in Oil & Gas (Value-added water treatment):

- No degradation evidenced in over 400h continuous operation of accelerated testing including stack disassembly and reassembly
- Acid and caustic concentrated to >1M at electrodes
- \$12/bbl savings realizable at measured operating efficiency through combined reduced disposal and chemical costs
- Aemion™ polymer coating advanced to large industrial pilot

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What Problems Are We Solving?

- AEMs are chemically and mechanically robust or high efficiency & selectivity but not both, limiting opportunity to produce valuable products from waste
- Aemion hit >95% total acid/brine recovery and exceed 1M H₂SO₄ target with positive lifetime indicators, at 10%-25% the thickness of the competition for leading electrical efficiency and operating cost.
- For integration into highly oxidative, oxygen deprived electrodes, it was the only candidate to provide economical lifetime for co-production of mixed caustic at target 1.5M concentration from produced water.



What This Means For The Future?

Technology that was previously infeasible due to a lack of suitable membrane options are now becoming realizable. Combinations of chemical stability, mechanical strength, low electrical resistance and reasonable costs mean that technology developers now have additional options at their disposal. In particular, Ionomr polymers represent collaborative advancement in the field:

- Steps taken toward net-zero cost industrial water treatment
- Reduced transport of hazardous waste for both supply and disposal
- Enabling niche applications previously infeasible due to membrane limitations