



## **Purolite® Ion Exchange Resins for Recovery and Purification of Rhenium**

**7th International Symposium on Technetium  
and Rhenium – Science and Utilization  
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PUROLITE INTERNATIONAL LIMITED



## **Introduction to Purolite**

Founded in 1982 by Stefan and Don Brodie

Globally diversified business:

- Sales offices in 42 countries, distributors selling in an additional 16 countries
- Manufacturing in USA, Romania, China
- Five R&D facilities in different countries including Russia

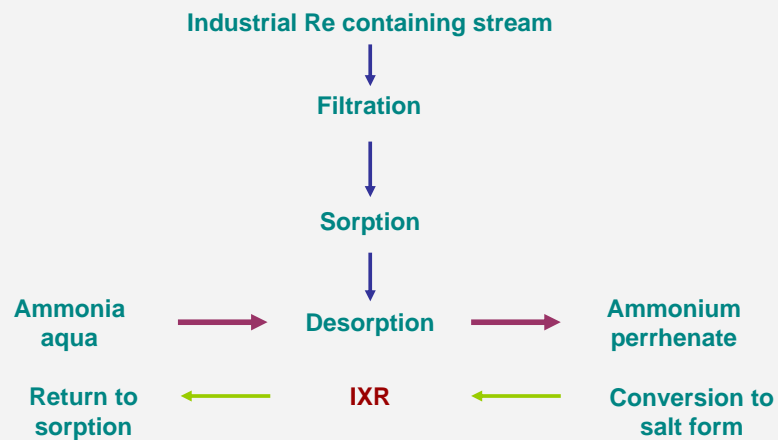
Purolite is the only pure-play IER manufacturer

Purolite is 2<sup>nd</sup> – 3<sup>rd</sup> Largest Ion Exchange Resin Company  
in Industry

Purolite manufactures two **Weak Base Anion Exchange Resins** tailored for processing of different rhenium solutions:

- **Macroporous Purolite<sup>®</sup> A170**  
Re prevails over Mo either low concentrations of Re (first tens ppm) with high Mo background.
- **Gel Purolite<sup>®</sup> A172**  
Mo prevails over Re but concentration of the later is relatively high (up to hundreds ppm).

## I. Recovery Of Rhenium in Absence of Molybdenum

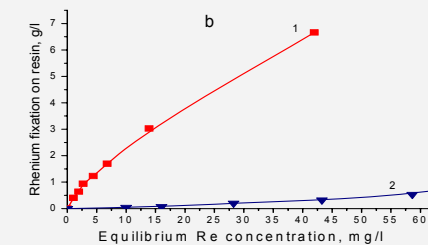
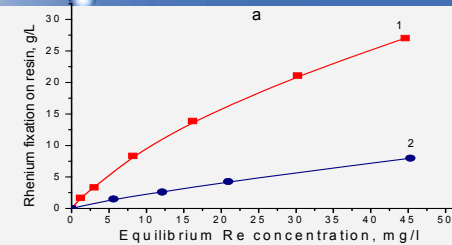


Rhenium sorption from rinsing sulfuric acid on

(1) A170/4675

(2) contender WBA resin

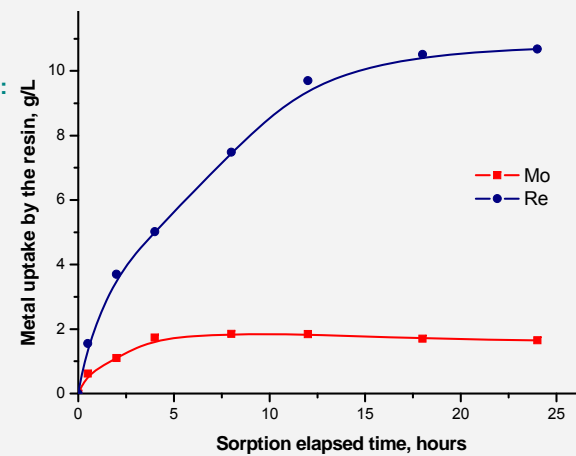
Sulfuric acid strength is 300 g/l (a) and 600 g/l (b).



## II. Recovery Of Rhenium From Industrial Streams Bearing Molybdenum

Composition of the  
artificial solution, mg/L:  
Mo – 3200;  
Re – 12.5;  
P – 70.0;  
Cl – 16.0;  
SO<sub>4</sub><sup>2-</sup> - 100 g/L;  
pH = 1.2

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Solution matrix,  
mg/L:

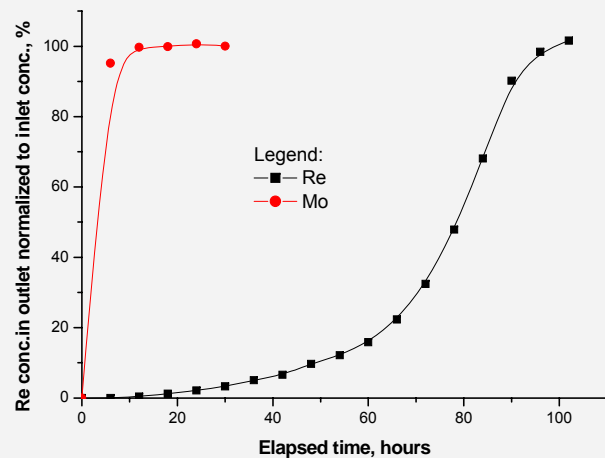
Re – 18.9;

Mo – 3426;

pH = 1.15.

Flow rate 10  
BV/hour

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Desorption by 5% ammonia

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	Mo	Re
Residual capacity in the resin, <b>g/L</b>	0.07	0.83
Concentration in entire desorbate, <b>mg/L</b>	15.4	766
Time desorption, <b>hours</b>	5.0	30.0
Separation number, $(Re/Mo)_d / (Re/Mo)_{feed}$	8 990	

**Purolite<sup>®</sup> S957:** Macroporous polystyrenic matrix,  
phosphonic + sulphonic acid functionality

Artificial feed solution, mg/l

Re	Mo	Fe <sup>+3</sup>	Cu	H <sub>2</sub> SO <sub>4</sub>
1330	6956	2000	752	200 g/l

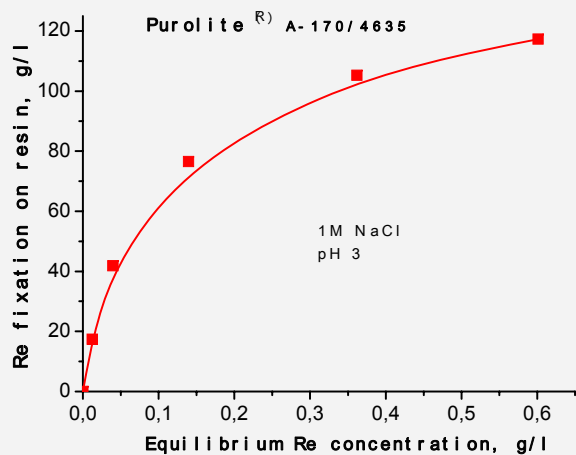
Resin capacity, g/l:

Re	Mo	Fe <sup>+3</sup>	Cu
0.007	53.6	14.9	0.11

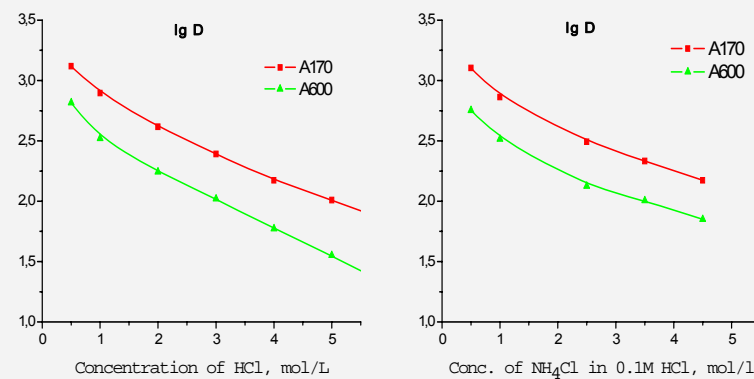
$$\frac{Mo}{Re} \text{ Separation Number (resin to feed): } \frac{(53.6/0.007)}{(6956/1330)} = 1464.$$

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### III. Recovery Of Rhenium From Different Acids

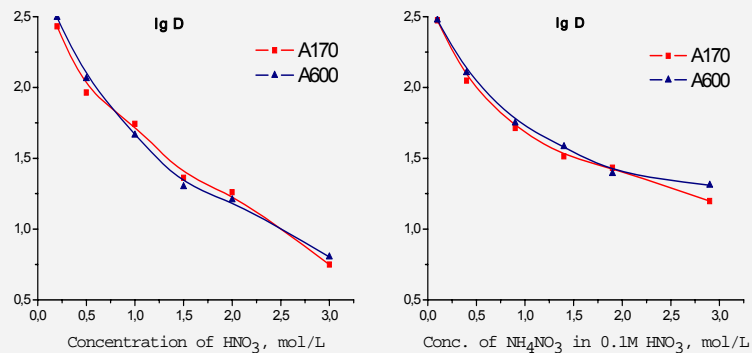


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Purolite<sup>®</sup> A-600: SBA resin, Type I, gel

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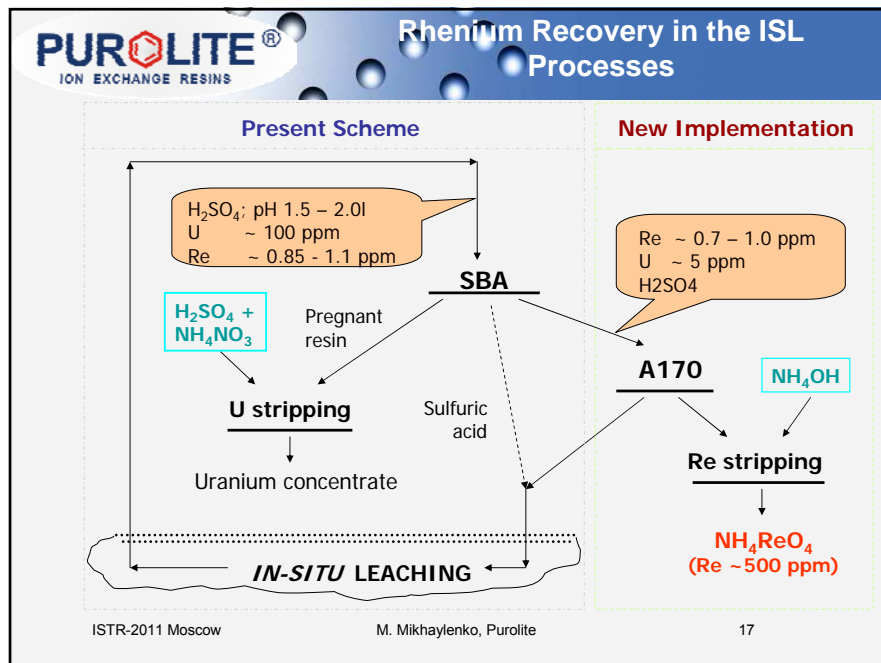


Purolite® A-600: SBA resin, Type I, gel

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## IV. Recovery of Rhenium from Uranium Barren Solutions at ISL Operations





**PUROLITE®**  
ION EXCHANGE RESINS

### Current Users of A170 Resin

Rhenium recovery from produced sulfuric acid at copper smelters:

- KGHM Ecoren, Poland
- Kennecott Utah Copper (Rio Tinto), USA

Rhenium recovery from uranium barren solutions:

- Navoi GMK, Uzbekistan

Processing of spent Re-Pt catalysts:

- Several enterprises in Russia

**Several new projects under development in USA, Russia and Asia.**

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