Method of Efficient Ion Separation by Electromigration Through Membranes

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The Problem:

The need is growing to produce a wide range of metals that have traditionally be difficult to separate. These include some of the rare earth metals and isotopes of more common metals with specific properties needed in the electronic and/or nuclear industries. Sources of these materials contain several metal and/or isotopes with such similar properties that separating and purifying specific metals or isotopes if difficult and costly. Many stages of steps of separation are required to meet purity needs, and with traditional methods the required number of stages presents many challenges.

The Solution:

Researchers at the University of Tennessee (UTK) and Y-12 National Security Complex have developed a novel method for separating metal ions in aqueous solutions with a novel electromigration system. This system can separate cations of metals with very similar, as well as dissimilar properties without the need for large capital equipment and/or use of toxic or costly components. When necessary, the process can economically incorporate a large number of stages to achieve high degrees of separation and purities. The process can be cost-effective, easy to maintain, and require relatively little space.

Benefits:

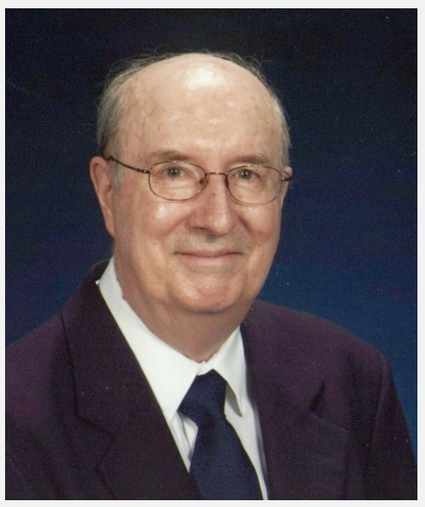
- Minimal stage size for multi-stage operation and high degree of separation.
- Expandable to accommodate various extents of separation to achieve high purities.
- Adaptable for the separation of various monovalent and multivalent cations.
- No hazardous components (e.g. organic solvents).
- Continuous flow

INVENTORS

Dr. Robert M. Counce

Professor, Department of Chemical and Biological Engineering

Dr. Counce is a Fellow of the American Institute of Chemical Engineers with over 40 years of experience. His research is focused on industrial and radio-chemical separations.



Dr. Jack S. Watson

Retired, Joint Faculty UTK and ORNL

Dr. Watson has over 40 years of experience at Oak Ridge National Laboratories and a part-time or adjunct professor at the UT. He has held several positions with the American Institute of Chemical Engineers and is the author or co-author of over 100 publications.

Lee Shippy

Graduate Student, Y-12 National Security Complex

Lee Shippy is a chemical engineer at the Y-12 National Security Complex and graduate student in the Department of Chemical and Biomolecular Engineering at UT with over 30+ years of R&D engineering experience and 15 US patents.

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