



THE INVENTOR



Howard L. Hall, Ph.D.

Dr. Howard Hall's interests focus on the application of science, technology, and public policy to nuclear security needs and challenges. Dr. Hall is a Professor at the University of Tennessee in the Department of Nuclear Engineering. He is appointed as the UT and Oak Ridge National Laboratory Governor's Chair in Nuclear Security. Prior to joining UT, Dr. Hall spent 20 years at Lawrence Livermore National Laboratory, where he led major scientific and operational missions in nuclear and homeland security. In 2005, Dr. Hall was part of the team awarded the Department of Homeland Security/Science and Technology Directorate Undersecretary's Award for Science.

Gas-Phase Thermochematographic Separation of Rare Earth Elements

The Technology:

Conventional solution-phase techniques used to separate and purify rare earth elements from mining activities and recycling of electronic devices are generally slow and costly and require extensive sample preparation. However, researchers at the University of Tennessee have developed a method for separating rare earth elements in the gas phase using gas thermochematography. This novel method offers the advantage of rapid, carrier-free separation of rare earth elements and has a smaller negative impact on the environment.

Benefits:

- Much faster than traditional separation methods
- Increases efficiency and decreases the cost of rare earth element purification
- Achieves up to 99.9999% purity
- More environmentally friendly

Applications:

- Rare earth element recycling and purification
- Volatilization of rare earth minerals
- Mining

For further information contact:

UTRF Licensing Assistant:

Andreana Leskovjan

Phone: **865.974.1894**

Email: aleskovj@utk.edu

Reference PD 14152

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