

THE ELTRON QUARTERLY

Eltron Research & Development Updates

October 2010: Fall Issue

Eltron Research & Development

Eltron Research & Development and Eastman Chemical Company Team for Joint Development and Pilot Testing of Membrane System for Hydrogen Production and Carbon Capture



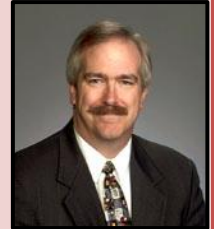
August 4 – Boulder, Colo. -- Eltron Research & Development, Inc. and Eastman Chemical Company announced today that they have signed a joint development agreement for the scale up and pilot testing of Eltron's advanced membrane system for hydrogen separation and carbon dioxide (CO₂) capture. The \$8 million development project is sponsored by a cooperative agreement from the U.S. Department of Energy.

Eltron's novel metallic membrane system extracts pure hydrogen from a mixed gas stream. The high purity hydrogen can be used for clean power generation, chemicals synthesis, and other applications. The membrane system retains carbon dioxide at high pressure. Eltron's membrane technology offers the potential to considerably reduce the capital and operating costs of producing industrial hydrogen in conjunction with CO₂ capture and storage.

The technology has been under development in Eltron's lab for eight years, supported by significant funding from the U.S. Department of Energy's (DOE) Office of Fossil Energy and their National Energy Technology Laboratory. Eltron's membrane system comprises proprietary membrane materials, equipment and associated processes. Upon successful demonstration, the complete technology package will be made available to industry through Eltron's licensing program.

A Note From Paul Grimmer, Eltron R&D's President

Welcome to Eltron R&D's first newsletter. I want to use this as a tool to be able to share our news as well as introduce some of the exciting technologies we are currently working on.



We've got a great team here, made up of about 50 scientists and engineers, who are committed to taking the technologies that they work with everyday and making them a reality in the real world. Since 2005, when I acquired the company, the biggest change I made was to allow our scientists to dream of great ideas that will change and improve the world, but then take the next step which is to focus and funnel these ideas down into a tangible product that can realistically be adopted into the marketplace.

Eltron R&D is set up to work with companies in numerous ways. Our main focus is inventing and developing new materials and products. Sometimes that is by ourselves but quite often it is in partnership with other companies, universities and national labs. If you have a need for new products and services we can help you dream up solutions. If you have the start of a solution we can help you develop it into a viable product.

We also do contract R&D for a number of companies. Some treat us as their "instant R&D department", allowing

The joint development and scale-up effort is underway and scheduled to culminate in a pilot demonstration in 2012 at Eastman's coal gasification facility in Kingsport, Tenn. According to Greg W. Nelson, senior Vice President and Chief Technology Officer at Eastman, "Eastman is pleased to participate with Eltron and the U.S. Department of Energy in this important project. Eltron's technology offers the potential to increase sustainability of hydrogen generation and greenhouse gas capture while reducing costs, and that's good for the industry and the environment."

"Advanced hydrogen and carbon separation technologies, designed to reduce cost and maximize efficiency, are critical for economical power from coal with carbon capture," said Dan Driscoll, Technology Manager at DOE's National Energy Technology Laboratory. "DOE and Eltron have collaborated for several years to develop an advanced hydrogen separation membrane which now appears ready for larger scale testing. It's extremely encouraging to have the involvement and support of a new industrial partner, Eastman. In the next development step, a new hydrogen-separation module will be tested on syngas from the Eastman coal gasifier in Kingsport, Tenn. If successful, this technology could help enable the production of ultra-clean, coal-based power."

"This project is about clean energy, national technology leadership and energy independence," said Eltron's President, Paul Grimmer. "We are extremely pleased to have Eastman join the development effort with their extensive experience as a global leader in industrial gasification."

[Click here to view Eltron R&D's Hydrogen Membrane Tech Brief](#)

Teaser for our Upcoming Winter Newsletter: Eltron R&D was recently awarded over \$71 million from the US. Department of Energy. This Recovery Act grant will decrease development time by about three years of a hydrogen transport membrane technology to cost-effectively separate hydrogen from shifted coal-derived syngas. [DOE Press Release](#)

Meet Our Scientist/Engineer

Eltron R&D is located in Boulder, CO. The majority of its residents are very outdoorsy and active, so it should come as no surprise that the majority of our staff have pretty interesting hobbies involving this location. Every quarterly newsletter, we will randomly choose an Eltron scientist or engineer to spotlight. This quarter, meet Chris Burk.

Q: Chris, how long have you been working at Eltron and what do you do?

CB: I am a process engineer and have been working at Eltron for about 3 ½ years, wow time flies. My time is split pretty evenly between developing our Hydrogen Peroxide/Peracetic Acid on-site generator and tackling incoming engineering consulting projects through Eltron's Contract R&D Program.

Q: What brought you to Boulder, CO?

CB: After I graduated from Cornell University, I moved out here to be close



them to test new concepts quickly and more cost-effectively than either starting a new R&D department or working with a non-commercially-focused R&D group. Services we have provided range from 3rd-party technical or commercial evaluations to running lab experiments to designing and operating scale-up facilities and processes. This is very much a win-win for both parties. Our clients get the assistance they need to develop their products and we have a source of revenue that we use to develop our own technologies.

I hope you enjoy our newsletter. The economy is still very challenging for all of us but we see signs of improvement in the area of new product development. I hope that as your company moves in that direction that you will give us a chance to help improve your business.

Sincerely,

Paul Grimmer

Recently Awarded Projects

- **EPA** – Phase 1 – Low Cost Retrofit Emissions Control in Off-Road Sources
- **DOD, DARPA** – Phase 1- Graded AlN/Al₂O₃ Precursor and Methods to Passivate Micro-Channel Coolers
- **USDA** – Phase 1 – Retrofit Emissions Control Technology for Agricultural Diesel Sources
- **DOE** – Phase 1 – A Compact Integrated System for Air Capture on Atmospheric CO₂

to big mountains, blue skies, and truly embrace my love for rock climbing. Ever since I got here, I've been enjoying warm evenings "cragging" in Eldorado Canyon, hard alpine weekends in Rocky Mountain National Park, and regular climb trips throughout the United States and beyond.

Q: You've taken quite a few trips traveling around the world to climb various mountain ranges. Do you have a favorite place you've climbed?

CB: Rocky Mountain National Park is of course one of my favorite spots to go, but I just got back from Chamonix, France a few months ago which I really enjoyed. I'd definitely like to go back there.

Q: I hear you play an unusual instrument. Is this true?

CB: Yes, I dabble in the study of the accordion actually. I started when I was 7 because I was very impressed with my cousin in Germany who plays.

Q: So, seeing as how you have some German relatives, I'd say it is safe to say they were your favorite for the World Cup this summer. How did you feel about the Germany versus Spain game last July?

CB: It was a very close game! I don't want to talk about it!

Q: Well, that seems to be all the time we have for this quarterly newsletter's portion of Meet Our Scientist/Engineer.

- **DOE – Phase 2 –**
Unconventional High Temperature Nanofiltration for Produced Water Treatment
- **DOE – Phase 2 - Molecular Separations Using Micro-Defect Free Ultra Thin Films**
- **USDA, NIFA – Phase 2 –**
Regenerable Ethylene Removal

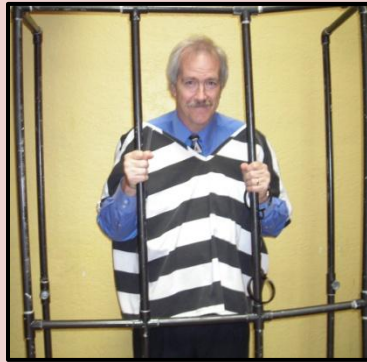
Interested in seeing what other projects are going on at Eltron?

Check out our "[Book of Stuff](#)" which contains up-to-date Eltron R&D tech briefs.

Philanthropy

Muscular Dystrophy Association

This year, Eltron R&D participated in the 2010 MDA Lock-Up for Boulder. As one of the area's "Most Wanted", Paul Grimmer was "Locked Up" to benefit the Muscular Dystrophy Association. The Eltron employees banded together and were able to successfully bail him out. Paul "served" his time at the Rio Grande Mexican Restaurant in Boulder at high noon on May 14, 2010 and was let out on "good behavior" after lunch.



Eltron Contract R&D Services:

- Catalyst Design, Synthesis, Scale-up and Evaluation
- Materials Research & Materials Synthesis
- Design & Engineering
- Analytical Services
- Consulting
- Third-party Testing & Analysis

Learn more about these services:

- [Eltron Contract Services Link](#)
- [Contract Services Brochure](#)

About Eltron Research & Development

Eltron is a leading R&D organization with a 30-year history of providing technology solutions to the energy and chemicals industries.

Eltron's scientists and engineers have generated over 70 patents based on technology developed at the company's world class research facility in Boulder, CO.

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