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Lightweight metal startup takes aim at auto fuel efficiency

By Kyle Alspach

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Steve Derezinski has his eye on 2016, the year the nation's combined fuel economy average for new vehicles will rise to 35.5 miles per gallon.

Derezinski and his Natick-based startup, **Metal Oxygen Separation Technologies Inc.**, are working to produce a light magnesium metal that can be used to replace heavier metals in automobiles. If the project succeeds, a reduction of 1.5 miles per gallon to 2 mpg will be achievable in vehicles through the company's technology, he said.

"We have a year-long program in place to get (the production process) out of the university and get it proven in the industrial setting," Derezinski, CEO of the company, said in an interview with Mass High Tech. The project officially kicked off in April.

Derezinski, who holds an MBA from MIT, and Adam Powell, who holds a doctorate in engineering from MIT, co-founded the company in 2008 after reviewing hundreds of university technologies. They found a research partner in Uday Pal, head of the division of materials science and engineering at Boston University, who is working with the company's four-person team.

The National Science Foundation provided startup funding of $100,000 to the company in June 2009, and the company has received $1.1 million in grants this year from the U.S. Department of Energy, including a **$260,000 award** earlier this month.

The firm also has backing from angel investors, who are not being identified by the company, Derezinski said.

The company's patented process starts with oxide ore, mined from sources around the globe, which is heated to produce magnesium oxide.

The compound is then used in a high-temperature electrolysis process, in which a membrane directly pulls off the oxygen and produces magnesium metal.

The process is the cleanest available for producing magnesium metal, according to Derezinski. The process used by a competitor company produces carbon dioxide and chlorine as a byproduct, he said. "Ours is pure oxygen," Derezinski said.

A 2006 report, "Magnesium Vision 2020," funded by the DOE and major U.S. automakers, found that use of magnesium could decrease average vehicle weight by 290 pounds or more.

A vehicle's average magnesium content, the report found, could rise to as much as 350 pounds, replacing heavier metals.

At Metal Oxygen Separation Technologies, the end goal is to become a manufacturer of the capital equipment that will be used to produce the magnesium metal for autos. After completing the research project, the firm intends to start designing the equipment in summer 2011, Derezinski said. If all goes well, the company will be selling the equipment within 18 to 24 months, he said.

"We hope to help all the automotive manufacturers meet their 2016 fuel efficiency goals," he said.