

# ZAF Energy Systems' Receives a Small Business Innovation Research Award from the National Science Foundation

*Rechargeable Hybrid Aqueous Battery with Novel Freeze Tape Cast 3-D Zinc Electrode*

JOPLIN, MISSOURI, UNITED STATES, March 6, 2020 /EINPresswire.com/ -- [ZAF Energy Systems Inc.](#) (ZAF), a developer of next-generation zinc battery technologies, has received a Phase I Small Business Innovation Research (SBIR) award from the National Science Foundation (NSF) to develop a Rechargeable Hybrid Aqueous Battery (ReHAB) with a novel freeze tape cast 3-D zinc electrode.

Although lead-acid and lithium-ion batteries dominate the majority of electrification markets lead-acid batteries suffer from low cycle life and energy while lithium-ion are expensive and pose safety risks. These drawbacks open the door for the ReHAB battery chemistry to become a drop-in replacement to the lead-acid and lithium-ion markets such as stationary, renewable energy storage, data center backup, and industrial motive. The primary goal of the ReHAB battery will be to step into these established markets as a lower levelized cost of energy and safer replacement to current technologies. These target markets total more than \$50 billion in annual sales and continue to grow.



Dr. Adam Weisenstein, Chief Technology Officer at ZAF Energy Systems

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*Dr. Adam Weisenstein, Chief Technology Officer at ZAF Energy Systems*

According to Dr. Elton Cairns, Faculty Senior Scientist at LBNL and Professor of the Graduate School at UC Berkeley, “The proposed rechargeable hybrid aqueous chemistry is well suited for many battery applications due to the projected high specific energy (>100 Wh/kg) of a safe aqueous chemistry with a potential for thousands of cycles”.

ReHAB is an emerging, high efficiency rechargeable battery technology that utilizes the high specific energy density of lithium intercalation electrodes with affordable, nontoxic zinc electrodes. The electrolyte is water-based and is more conductive than non-aqueous electrolytes, which makes ReHAB cells a safe, alternative solution for many battery

applications. Since the start of the Phase I project, ZAF has engineered intercalation electrodes at 6X the capacity of a typical lithium-ion cathode along with a novel anode design and electrolyte that combat zinc shape change and dendritic growth.

According to [Dr. Adam Weisenstein](#), Chief Technology Officer at ZAF Energy Systems and

Principle Investigator of the Phase I SBIR, “By combining an intercalation electrode, a zinc electrode, and an aqueous electrolyte, ReHAB can be a very disruptive battery technology due to the long-life, safe, and low-cost nature of the chemistry. The technology will also be very environmentally friendly as it is cobalt and lead free.”

About ZAF Energy Systems, Inc. Incorporated in 2011 with locations in Bozeman, Montana and Joplin, Missouri, ZAF Energy Systems develops and commercializes next-generation zinc battery technologies that use sustainable, non toxic materials and can be safely and easily recycled. Its breakthrough battery technologies include Nickel-Zinc, Zinc-Air, and rechargeable hybrid aqueous battery chemistries. ZAF’s rechargeable batteries provide long-life and economical solutions in a safe package for a variety of applications. For more information, visit: [www.zafsys.com](http://www.zafsys.com)

About the NSF’s Small Business Programs America’s Seed Fund powered by the National Science Foundation (NSF) awards \$200 million annually to startups and small businesses, transforming scientific discovery into products and services with commercial and societal impact.

Startups working across almost all areas of science and technology can receive up to \$1.5 million in non-dilutive funds to support research and development (R&D), helping de-risk technology for commercial success. America’s Seed Fund is congressionally mandated through the Small Business Innovation Research (SBIR) program. The NSF is an independent federal agency with a budget of about \$8.1 billion that supports fundamental research and education across all fields of science and engineering. For more information, visit [seedfund.nsf.gov](http://seedfund.nsf.gov).

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Next-generation Battery Technology