Infinity Turbine Introduces 3D-Printed Electrodes for Salgenx Saltwater Batteries and Electrocatalyst Applications

Infinity Turbine Develops 3D-Printed Anode and Cathode Mixed Material Electrodes for Flow Batteries, Gas Processing, and Electrocatalysts for Making Plastics

MADISON, WI, UNITED STATES, September 9, 2024 /EINPresswire.com/ -- Infinity Turbine is proud to unveil an innovative approach to electrode fabrication that combines fiber laser heat treating, 3D additive manufacturing, and laser-induced carbonization. This synergistic technology enables the direct transformation of carbon-rich materials like sugar and wood fibers (including bamboo) into hard carbon or graphene-like structures. The resulting 3D-printed electrodes are set to revolutionize the manufacturing of Salgenx saltwater flow batteries, gas processing, and electrocatalyst applications.

Pioneering 3D-Printed Electrodes for Saltwater Flow Batteries

The Salgenx saltwater flow battery is a leading solution for safe, environmentally friendly grid-scale energy storage. With the introduction of 3D-printed carbon electrodes, Infinity Turbine enhances the battery's efficiency by providing a high-conductivity, high-surface-area electrode structure. The combination of laser-induced graphene and tailored 3D-printed geometries allows for faster ion exchange, improved energy density, and longer battery life, all while using sustainable, carbon-rich materials. The concept of a 3D printed electrode reduces manufacturing time and complexity, resulting in more efficient electrode production with just-in-time (JIT) technology integration and decreased inventory costs.

Key Features of the New Electrode Technology:

• Laser-Induced Carbonization: Using fiber lasers, Infinity Turbine can transform organic

materials like sugar into graphene-like carbon, offering exceptional conductivity and structural integrity using real-time on-demand heat treating.
• 3D Additive Manufacturing: Layer-by-layer additive processes allow for the creation of highly customized electrode structures with enhanced surface area and mechanical strength, vital for improving energy storage capacity.
• Oxygen-Deprived Environment with CO□: By conducting the process in a CO□-flooded environment, the carbonization process is more efficient, ensuring high-purity carbon structures without combustion.
• Materials Integration: Just-in-time manufacturing allows the fast development and deployment of a diverse selection of battery materials , including metalic powders, insulators, and more.
• Mixed Layers: Utilizing stratification of layers can be used in the gas processing and as a electrocatalyst. 3D additive layer building provides an array of gas and liquid processing functions.

These electrodes will enhance the performance of Salgenx saltwater batteries, which are known for their safety, cost-effectiveness, and environmental friendliness. The new carbon structures will improve battery charge times, energy density, and longevity, offering a new level of performance for renewable energy storage systems.

Research and Development

The concept of 3D-printed selectable powdered materials content electrodes are a game-changer for research and development, allowing for fast concept-to-realization material and product commercialization.

Battery Cell Fabrication Methodology

This concept will also open up a new industry for building 3D machines for electrode and electrocatalyst research and development groups as well as manufacturing. This process is akin to the Telsa Gigapress, but brings a synergy to materials blending within a battery structure. With this process, anodes and cathodes can now be 3D printed together to make a complete electrolyzer cell.

Additional Applications: In-Situ Processes for Gas Filtering and Processing

The flexibility of this technology extends to gas processing applications. By utilizing the 3D-printed carbon structures and material layers created through this process, Infinity Turbine envisions new possibilities for in-situ gas processing into advanced materials. This integration could enable more efficient carbon capture and conversion systems, leveraging the high surface area and conductivity of the graphene-like materials. The concept could also be applied to electro-desalination for the production of fresh water from seawater.

Electrocatalyst Applications

The Infinity Turbine 3D build concept can seamlessly integrate with advanced electrocatalyst technology, enabling efficient conversion of CO2 and water into valuable carbon building blocks. By leveraging the electrodes modular and scalable design, a electrocatalyst system can efficiently process carbon dioxide and water, yielding high-purity products like methylglyoxal (C3) and 2,3-furandiol (C4) with over 99% efficiency. These products have significant potential in sustainable manufacturing, offering safer alternatives for industrial applications such as plastics and adhesives, where methylglyoxal could replace toxic formaldehyde. This synergy between a 3D build matrix and electrocatalysis may create a highly efficient, environmentally friendly production method for various essential materials.

A Breakthrough in Energy Solutions

Infinity Turbine's 3D-printed carbon electrode technology marks a significant leap forward in both energy storage and electrocatalyst cell development. From improving the efficiency of Salgenx saltwater batteries to gas processing, these carbon-based materials will enable a new era of clean, efficient energy technologies. By utilizing sustainable organic materials like sugar and wood fibers, Infinity Turbine also demonstrates its commitment to environmentally friendly manufacturing and sustainable innovation.

About Infinity Turbine LLC

Infinity Turbine is at the forefront of developing innovative, sustainable energy storage solutions and machines to realize concept-to-commercialization. Saltwater batteries provide a safe, non-toxic, and cost-effective alternative to traditional lithium-based energy storage systems. Committed to advancing green technology, Infinity Turbine continues to explore and develop cutting-edge renewable materials and methods to meet the growing global demand for renewable energy storage, as well as eco-friendly plastics and more.

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