Title: Aluminum Gallium Water Reactor V2
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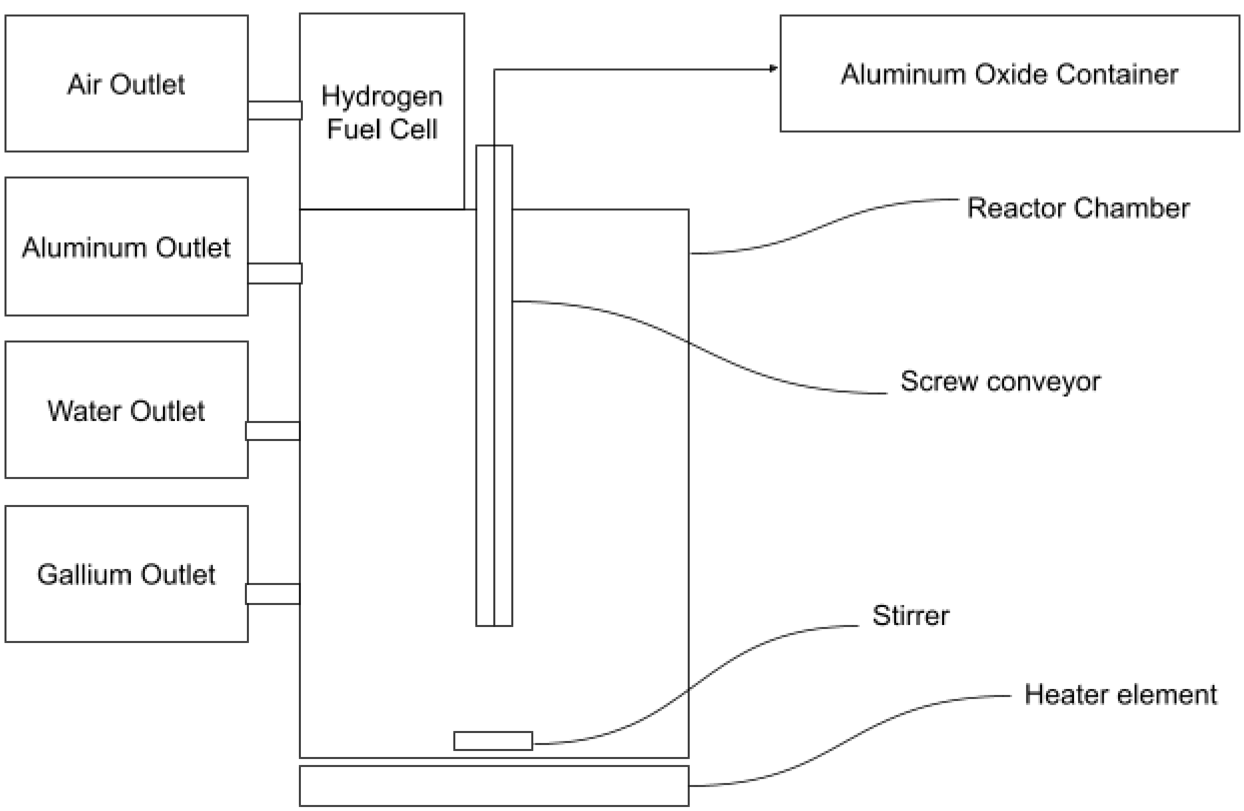
Abstract:
This public disclosure discloses a novel reactor design specifically engineered for the controlled chemical reaction between aluminum and water in the presence of gallium, resulting in the generation of hydrogen gas and aluminum oxide. To address the inherent challenges of gallium-induced corrosion, all reactor components are constructed from non-metallic materials. A central feature of this reactor design is a mechanical stirrer strategically positioned at the core, effectively pushing the gallium towards the reactor's perimeter through centrifugal forces. This motion ensures the continuous and uniform mixing of aluminum, water, and gallium, facilitating the desired chemical reaction. Additionally, a specialized mechanism, represented as a screw conveyor, is integrated into the reactor's central region, efficiently extracting the produced aluminum oxide from the reaction mixture using a lifting screw motion, and placing it into a separate container for aluminum oxide. Aluminum and water outlets are positioned to deposit aluminum and water to the periphery of the reactor chamber, where the gallium is located. A gallium outlet allows for the replenishment of the gallium inside of the reactor. The Hydrogen produced from the reaction is directed towards a hydrogen fuel cell where it combines with outside air to produce water and electricity. The water is then redirected back into the reactor chamber. A heater element ensures optimal temperature for the reaction to take place. The reactor design presented herein offers a corrosion-resistant, efficient, and controllable system for the production of hydrogen gas and aluminum oxide for use in energy systems.



Claim 1: A reactor system for the controlled chemical reaction between aluminum and water in the presence of gallium, facilitating the generation of hydrogen gas and aluminum oxide, comprising:

a. A reactor chamber constructed entirely from non-metallic materials to prevent gallium-induced corrosion.

b. A mechanical stirrer positioned at the core of the reactor vessel, designed to create centrifugal forces that push gallium towards the reactor's perimeter and ensuring continuous and uniform mixing of aluminum, water, and gallium.

c. A specialized mechanism integrated into the central region of the reactor vessel, represented as a screw conveyor, employing a lifting screw motion, for the efficient extraction of produced aluminum oxide from the reaction mixture and its transfer into a separate aluminum oxide container.

Claim 2: The reactor system of claim 1, further comprising:

a. An aluminum outlet positioned at the periphery of the reactor chamber to deposit aluminum into the reaction mixture.

b. A water outlet positioned at the periphery of the reactor chamber to deposit water into the reaction mixture.

c. A hydrogen fuel cell connected to the reactor chamber to receive and utilize the hydrogen gas produced in the chemical reaction.

b. An air inlet connected to the hydrogen fuel cell to facilitate the combination of hydrogen gas with outside air, resulting in the production of water and electricity.

c. A water conduit connected to the hydrogen fuel cell to redirect the produced water back into the reactor chamber.

Claim 3: The reactor system of claims 1 and 2, further comprising:

a. A heater element integrated into the reactor chamber to maintain and control the temperature within the reactor chamber, optimizing the chemical reaction between aluminum and water in the presence of gallium.

Claim 4: A method for generating hydrogen gas and aluminum oxide using the reactor system of any of the previous claims, comprising the following steps:

a. Introducing water, aluminum, and gallium into the reactor vessel.

b. Activating the mechanical stirrer to create centrifugal forces, pushing gallium towards the reactor's perimeter, ensuring continuous and uniform mixing of aluminum, water, and gallium.

c. Allowing the chemical reaction between aluminum and water in the presence of gallium to occur.

d. Extracting aluminum oxide from the reaction mixture using a screw converyor.

e. Directing the produced hydrogen gas to a hydrogen fuel cell to generate electricity and water.

f. Redirecting the produced water back into the reactor chamber.

g. Controlling the temperature within the reactor chamber using the heater element to optimize the chemical reaction.