

Aluminum-Gallium Alloys: the Next Generation Global Source for Hydrogen Fuel

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A new global-scale, low cost, infinitely recyclable, zero-emission technology for generation and delivery of hydrogen fuel on demand!

Problem

- Fuel cells' energy density by weight is over ten times greater than lithium-ion batteries.
- Fuel cells can provide a steady supply of energy for days without the need to recharge.
- Hydrogen for fuel cells is very hazardous and expensive to store and transport.
- Currently, most worldwide H₂ production comes from steam reformation of natural gas.
- The current aluminum production processes are very energy intensive and have large carbon footprints, which amount to large costs.

Solution

3rd most abundant element

Aluminum

Safe and cheap to handle

Only emissions are water vapor

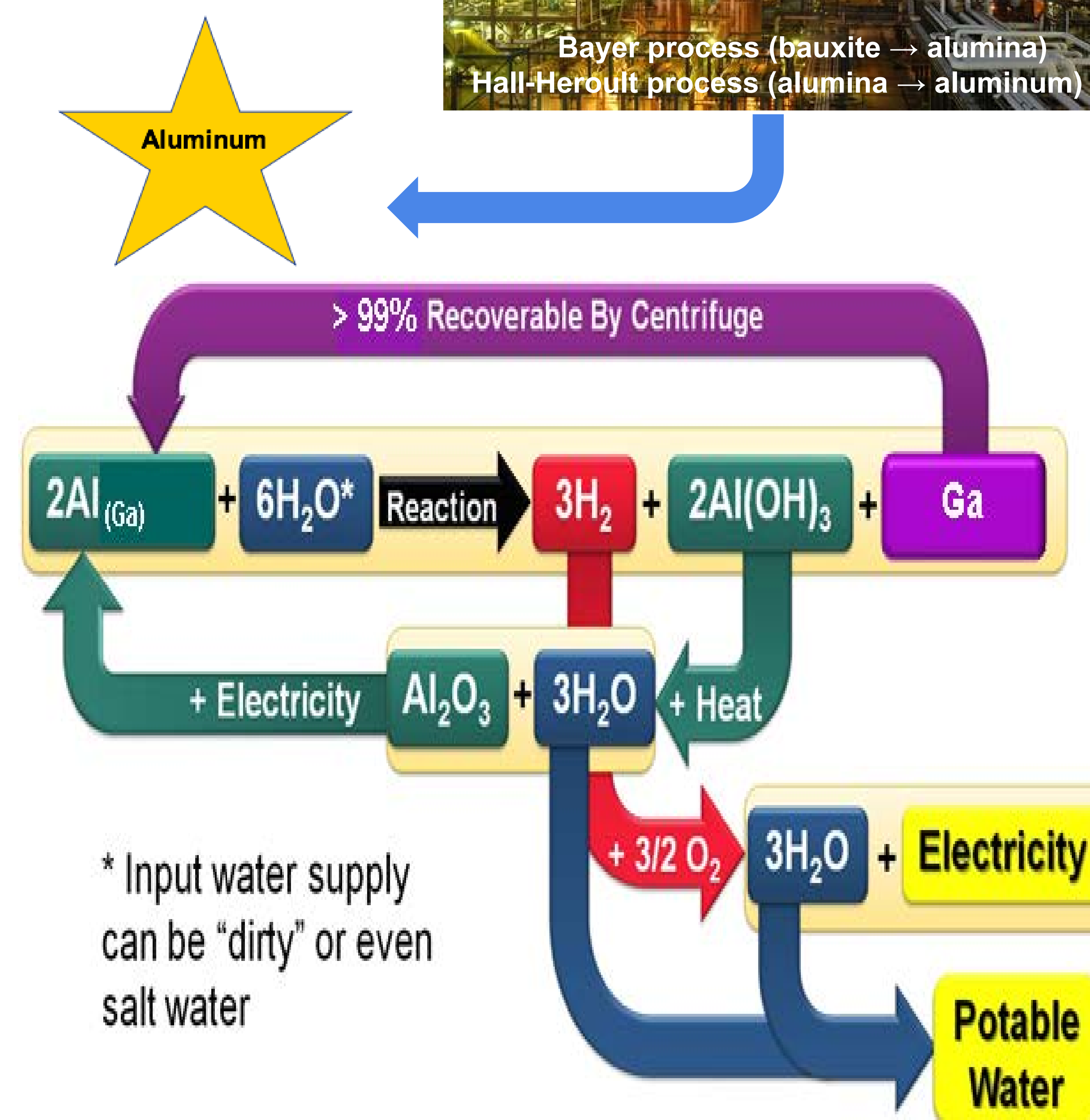
Can use unclean water

Economically recyclable

Our Project: Aluminum Splitting Water

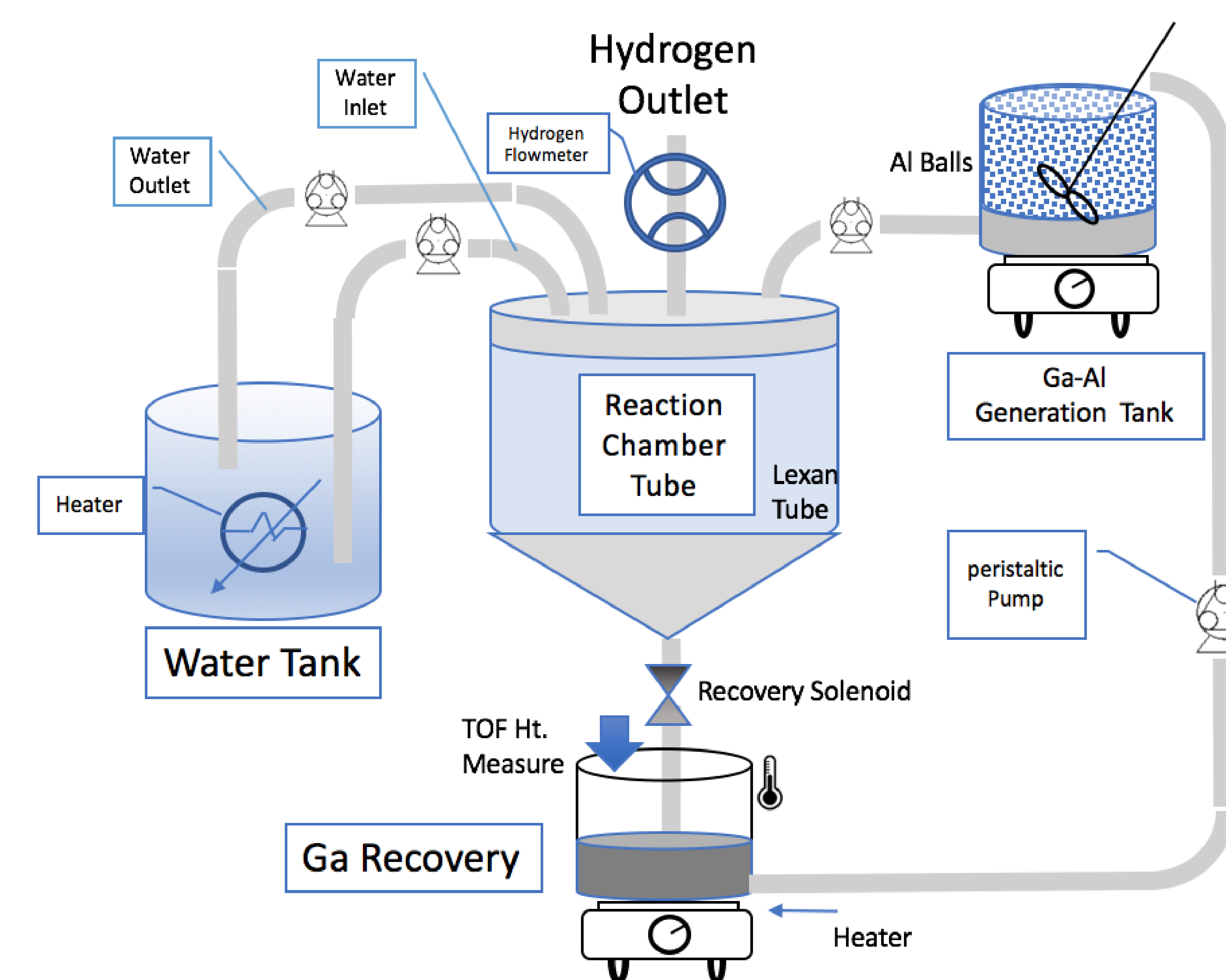


Bayer process (bauxite → alumina)
Hall-Heroult process (alumina → aluminum)



Methods

Reactor 3 Schematic



Conclusion

- Aluminum water-splitting using gallium is a **cheaper, cleaner and longer lasting** alternative to current hydrogen fuel sources.
- The point-of-use cost of H₂ from this process can be as low as \$2 per kg, compared to the current subsidized value of \$16 per kg.