



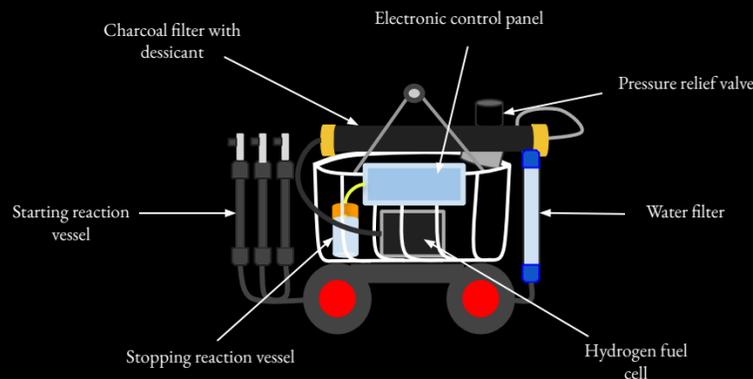
# Hylander Requiem

Faculty Adviser: Dr. Roman Voronov | Team Captains: Stephany Cabrejos, Allen Reed, Monica McEvoy  
Team Members: Michael Maffucci, Mory Diane, Antonio Antonucci, Jennifer Quiros, Dennis Lema, Haris Ahmed



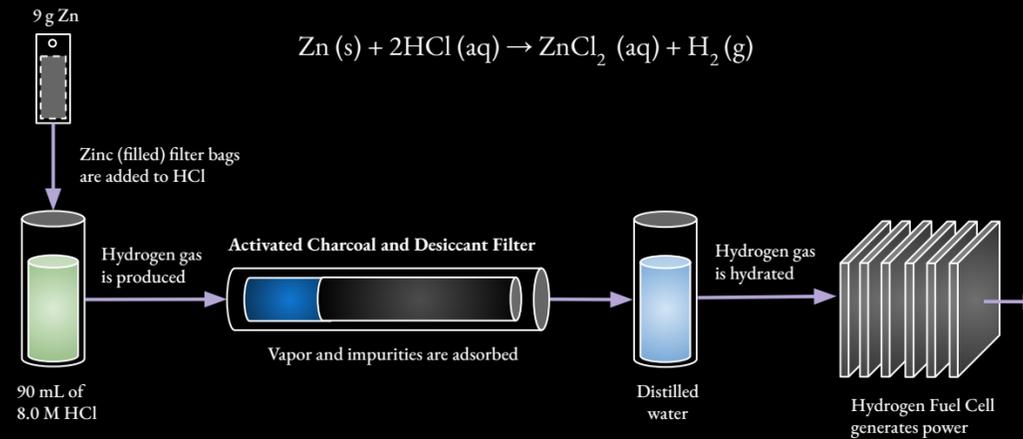
## Introduction

The car generates power using a reaction of hydrochloric acid and zinc which provides hydrogen gas to a hydrogen fuel cell. The stopping mechanism uses a reaction between a magnesium strip and sulfuric acid. When the magnesium strip fully dissolves, a sensor is activated which breaks the circuit that provides power to the motor.

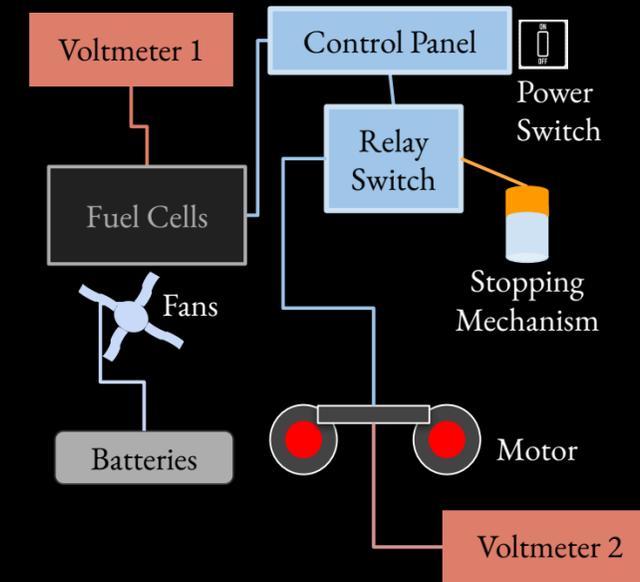


## Starting Mechanism

Self-made filter bags filled with zinc granules are placed into propulsion chambers and dropped into hydrochloric acid containers. This produces hydrogen gas to power up the car. The reaction is the following:



## Electrical Flow Process Diagram

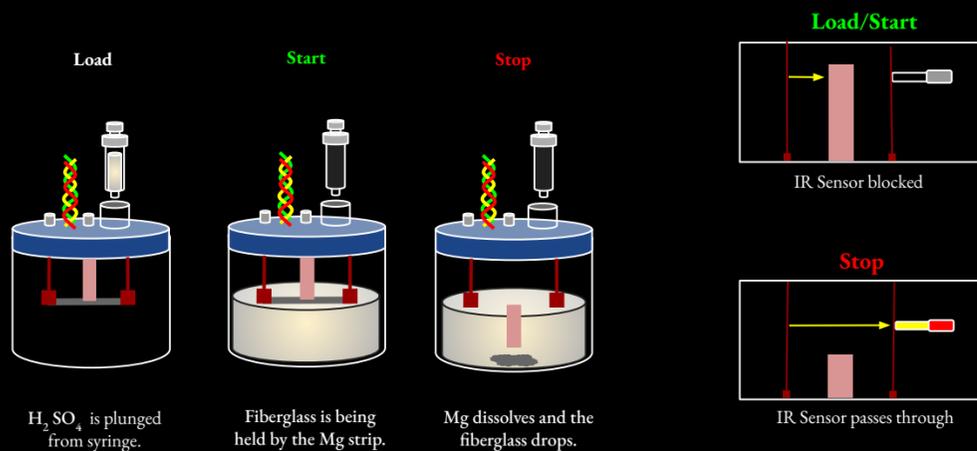
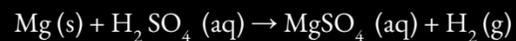


- Current flows from fuel cells, measured in Voltmeter 1.
- Control Panel handles power flow, activates Motor via Power Switch.
- After Power Switch activates, Motor starts. Motor voltage displays on Voltmeter 2.
- When Stopping Mechanism triggers, Relay Switch cuts power to Motor, stopping the car.
- Batteries power Fans on separate circuit and prevent product-H<sub>2</sub>O buildup on Fuel Cells.

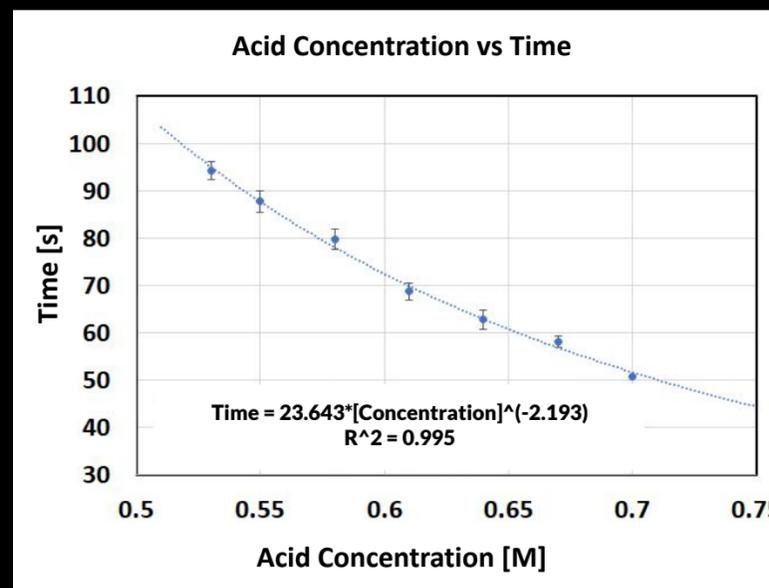
## Stopping Mechanism

Sulfuric acid is transferred to the container using a syringe to submerge a magnesium strip. The acid dissolves the strip which drops a fiberglass stick to allow light to pass through an IR sensor and break the circuit, stopping the car instantly.

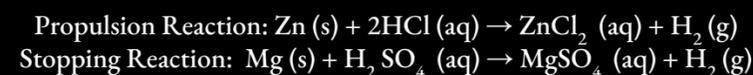
The reaction is as follows:



## Testing Results



Average Speed = 0.4 ± 0.0163 m/s



## Safety Features

- Hydrogen is an eco-friendly fuel source.
- Reaction vessels have double containment.
- Electrical connections are secured and properly insulated.
- Mechanical parts are guarded properly to avoid any pinch hazards.

## Unique Features

- Starting mechanism uses a “teabag” concept to power the car.
- Two stage filter/scrubber system (desiccant and activated charcoal).
- Hydration column which enhances mass transfer with bubbler.
- Fans remove excess product water from fuel cells, aiding reaction rate.