Propagation Controlled Solid Fuel-Oxidant Reactions for the Generation of Harvestable Heat

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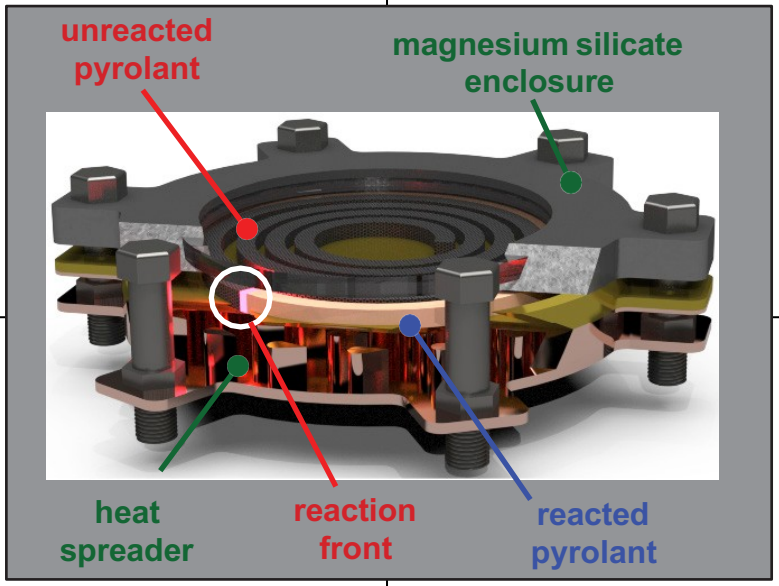
Research Objectives

- Develop slow propagating reactions
- Implement shapes for optimal energy harvesting
- Produce shaped reactant blends
- Design Thermal Reactor
- Construct and validate reactor



Approach

- Utilize self-propagating solid-solid reactions with high reaction enthalpies.

$MgB_2 + Li_2O_2 \rightarrow MgO + B_2O_3 + 4Li_2O$ 2.83 kWh/kg

- Structure reaction blends and add diluent to control burn rate - target 20 day burn.
- Produce a tortuous route burner to efficiently harvest reaction heat.

Potential Impacts

- High energy density heat source for short missions
  900-3600 We·hr/kg
- Increased safety
- Reusable and replenishable design will lower lifetime cost
- Enabling technology for short term missions with high power demands
- Elimination of need for radioisotope source on short missions