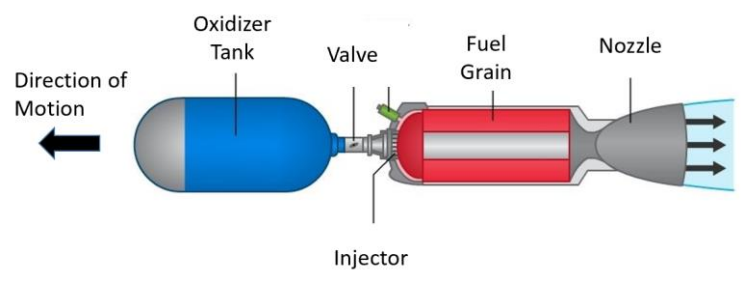
Want to do *Rocket Science*? Here's your chance!

Looking for motivated students to work on hybrid rocket propellants

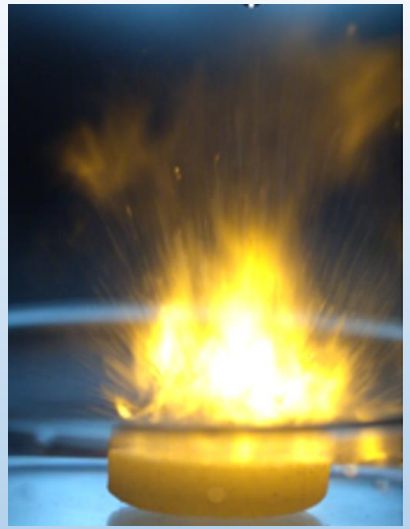
Rockets work by combustion which requires a fuel and an oxidizer. Solid and liquid rockets utilize fuel and oxidizer in the same phase (solid and liquid respectively). Hybrid rockets- the focus of our research- use fuels in the solid & oxidizers in the liquid phase. Hybrids are safe, cheap, allow thrust control and have a simpler design. However, without ignition of the propellant, our rocket's not going anywhere, and that's a challenge for hybrids. Hybrid ignition is plagued with problems such as delayed ignition and heavier motor weight to accommodate separate igniter systems. **Our research therefore focuses on utilizing an energetic but safe propellant combinations that reacts exothermically and ignites rapidly, thereby potentially overcoming ignition problems in hybrids.**



To overcome issues associated with hybrid rocket ignition, we'll utilize **hypergolic ignition**- ignition upon contact without the need for heat/spark. **H_2O_2** will be the oxidizer and **polyethylene** mixed with **$NaBH_4$** will be the fuel. **Utilizing high-speed, infrared and hyper-spectral imaging techniques** our research will seek to gain an in-depth understanding of hypergolic ignition involving the aforementioned propellant combination. **This can pave the way for safer and cheaper hybrid rockets- that run on plastic!**

Research Objectives

1. Reduce **Ignition Delay** of chosen hypergolic propellant
2. Determine **rate of relative heat release** associated with hypergolic ignition
3. Determine important **chemical species** involved in hypergolic ignition of chosen propellant



HYPERGOLIC IGNITION IN ACTION

Interested in joining the Combustion and Diagnostics Group? Email: joseph.lef@technion.ac.il