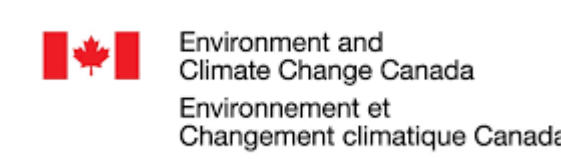


Advanced Tritium Compatible Materials and Tritium Batteries

Technical Lead: Donald Ryland

Federal Stakeholders:

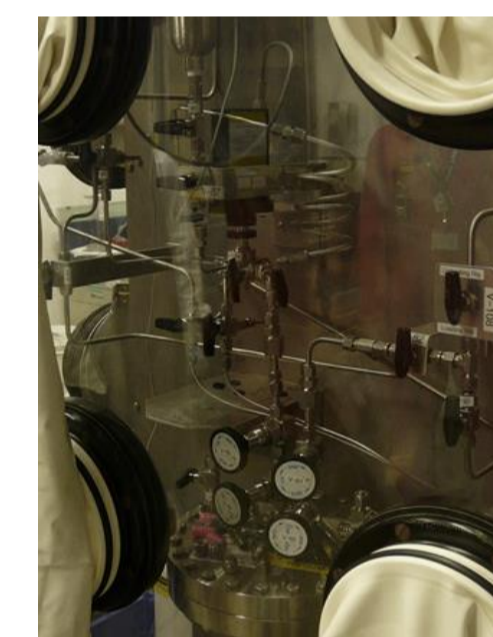
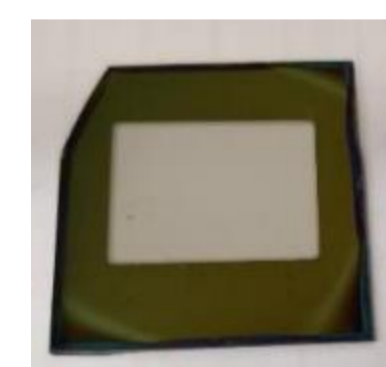


Objectives

- Demonstrate efficient power production from a tritium-powered device using advanced materials for tritium storage and β -energy conversion
- Develop coatings which prevent tritium permeation in metal components in high-temperature reactor systems
- Develop electrolyser membrane materials compatible with tritium-containing environments for tritium separation technology

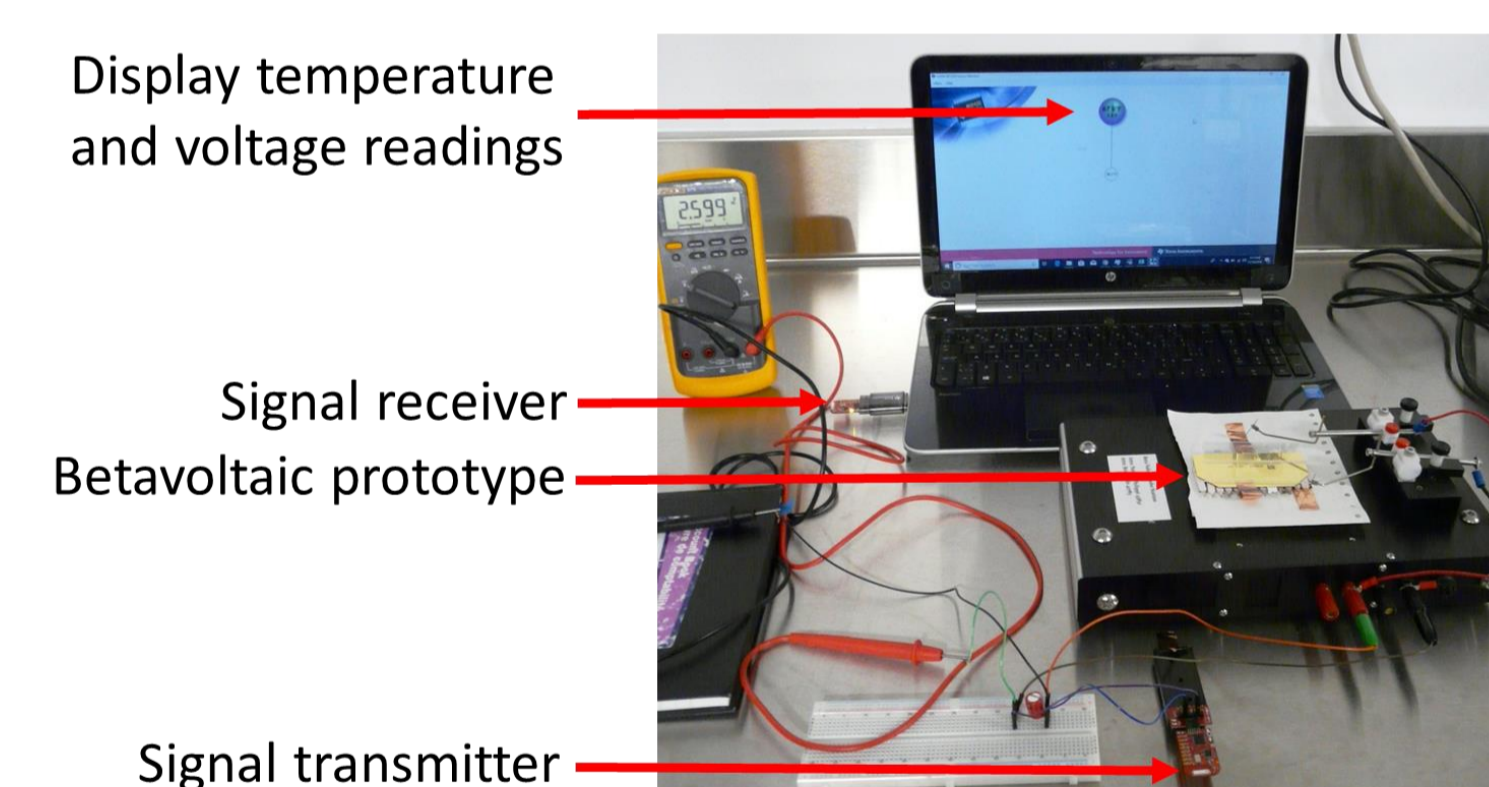
Tasks Performed

- Combined tritium lights with advanced photovoltaics to produce microwatt power sources; track tritium light intensity over time
- Studied tritium storage in thin films and develop semiconductor for direct betavoltaic power sources
- Exposed membrane materials to high-tritium environments



Achievements and Successes

- Prototype indirect betavoltaic device powered a thermocouple with wireless transmitter
- Metal films remained intact after hydrogen isotope loading for direct betavoltaics
- Developed method to determine tritium content of electrolyzer membrane materials



Future Work and Expected Outcomes

- Fabricate tritium powered device able to provide microwatt power
- Further develop thin-film semiconductors for direct betavoltaics
- Test additional candidate materials for tritium permeation

