

Li-O₂ Batteries for NASA Electric Aircraft (LiON)



- **Idea/Concept:**

- Li-Air batteries are a unique fit for electric aircraft due to their high theoretical energy densities and their potential to leverage on-board oxygen systems. We will investigate novel “electrolyte engineering” concepts integrating computation, material fabrication and cell/pack design to obtain Li-Air batteries with high energy densities, rechargeability and safety.

- **Transition opportunities/status:**

- TTT transition due to strong alignment of LiON battery computational tools development activities and the NASA Vision 2040 Study for Multiscale Materials Modeling and Simulations

- **Accomplishments:**

- High stability inorganic molten salt electrolytes designed and demonstrated to improve Li-Air cycle life
- Novel electrolyte additives designed, synthesized and demonstrated to improve cycle life
- Fundamental organic electrolyte decomposition chemistry discovered and detailed
- Li-Air battery pack built and demonstrated in the laboratory under electric flight conditions
- Multiscale modeling and simulations framework from fundamental chemistry to high throughput materials screening to battery multiphysics implemented and demonstrated to accelerate materials and cell development
- More than 20 peer reviewed journal articles and more than 40 conference presentations

