**What our lab does:**

- We grow **ultra-wide band gap semiconductors** for use in optoelectronic and electronic devices.
- We develop **new equipment technologies** to access new synthesis capabilities for both bulk and thin film growth.

**How we do this:**

- We use a variety of techniques to grow nitrides, including the **ammonothermal method** and novel **flux-based approaches**.
- We grow thin films using traditional and a novel **high pressure MOCVD system**.

**Why we are investigating this area:**

- The **sustainable electrification** of the USA demands efficient electric power conversion. Materials we are developing will eliminate waste heat production and enhance performance.
- **Disinfection of water and surfaces** is critical to our health. High power UV emitters offer a solution but require better materials and synthesis approaches for widespread use.

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**Activities:**

**Synthesis**

**Equipment**

**Modeling/Theory**

**Demonstrative Devices**

**Single Crystal Ammonothermal GaN**

\[ T_{\text{melt}} = 4000 \, ^\circ\text{C} \]

\[ P_{\text{melt}} = 12 \, \text{GPa} \]

**High Pressure MOCVD Tool Development**

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