

Synthesis of Novel Organic/Inorganic Hybrid Porous Materials

Materials Research Lab

University of California Santa Barbara

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Organic/Inorganic Hybrid Porous Materials

Overview:

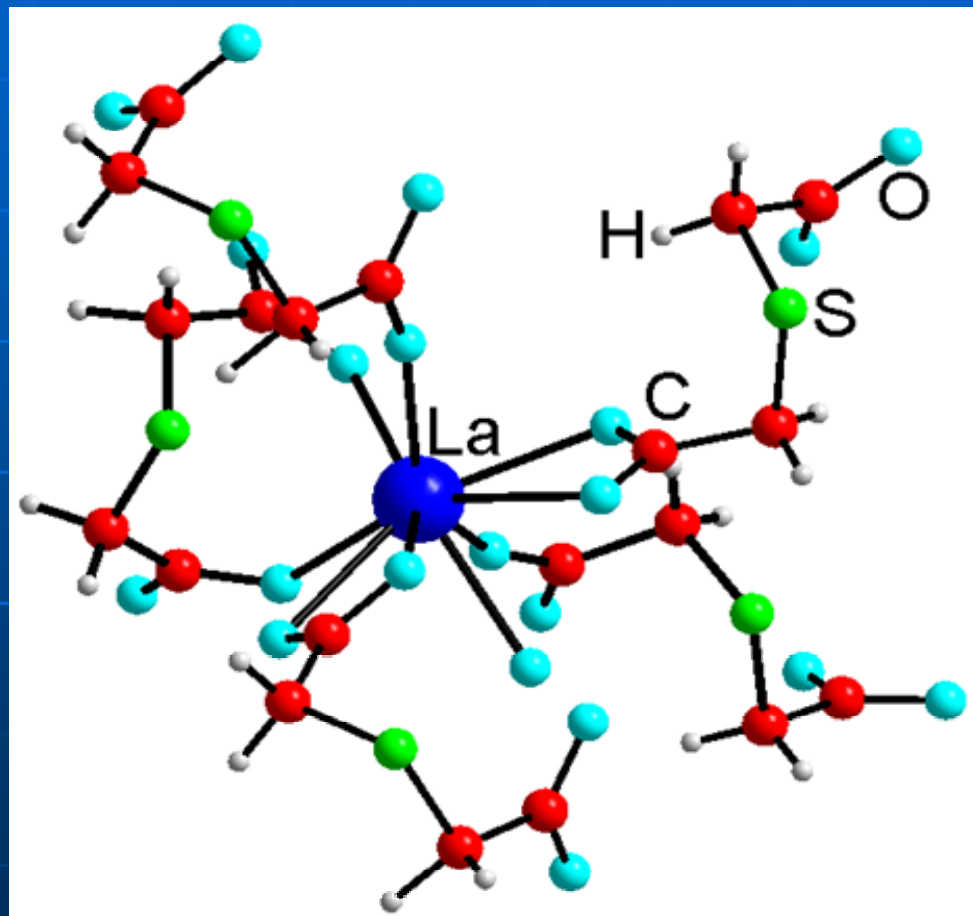
- What are Porous Materials?
- Why use Hybrids?
- How are these materials Useful?

Goals:

- Synthesizing of new materials
- Examining the effects of different organic acids and metals
- Determining structure
- Checking for thermal stability and optical properties

Preparation

- **Reactants and Ratios**
 - Organic Acids and Metals
 - pH Considerations

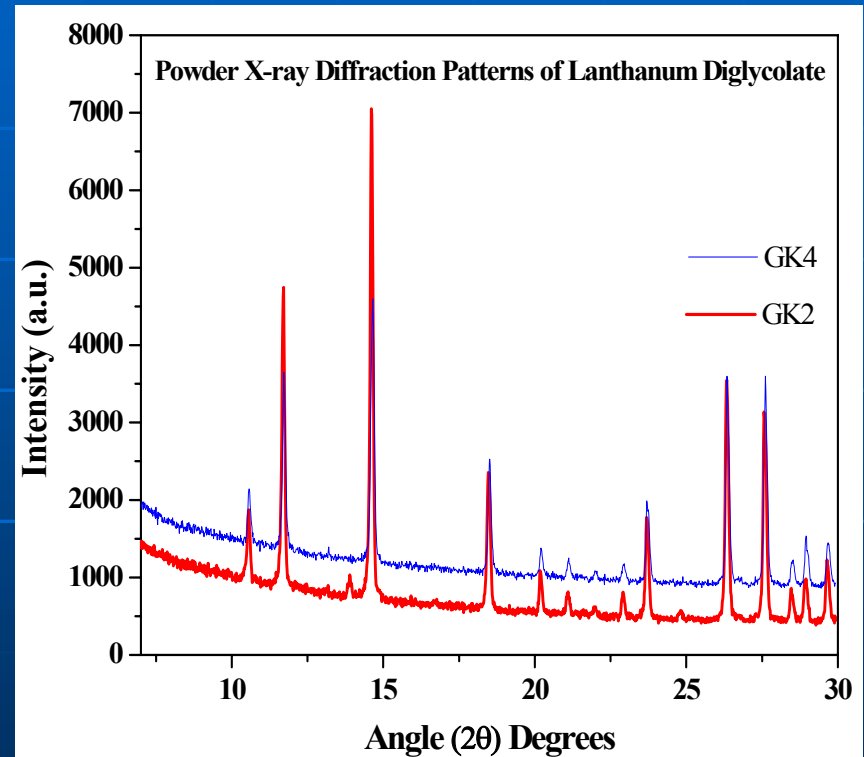


Hydrothermal Synthesis

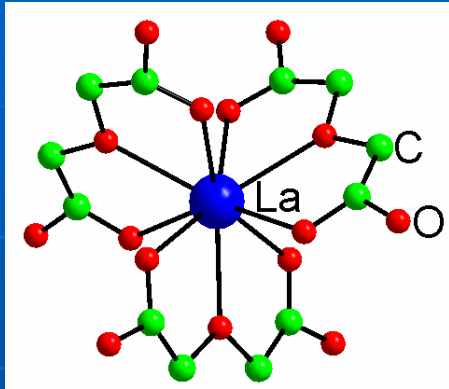
- Choose and Combine Reactants
- Teflon Lined Stainless Steel Autoclave
- Heat 180°C, 2-5 days
- Check pH, Filter Material

Characterization by X-ray Diffractometry (XRD)

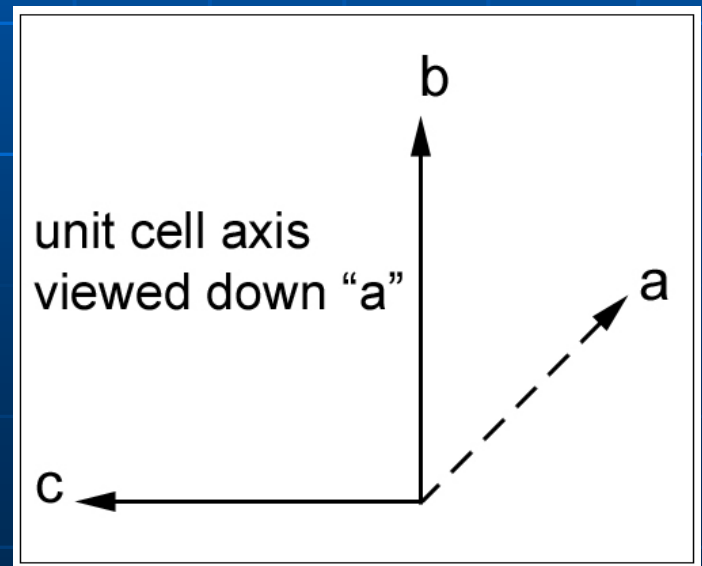
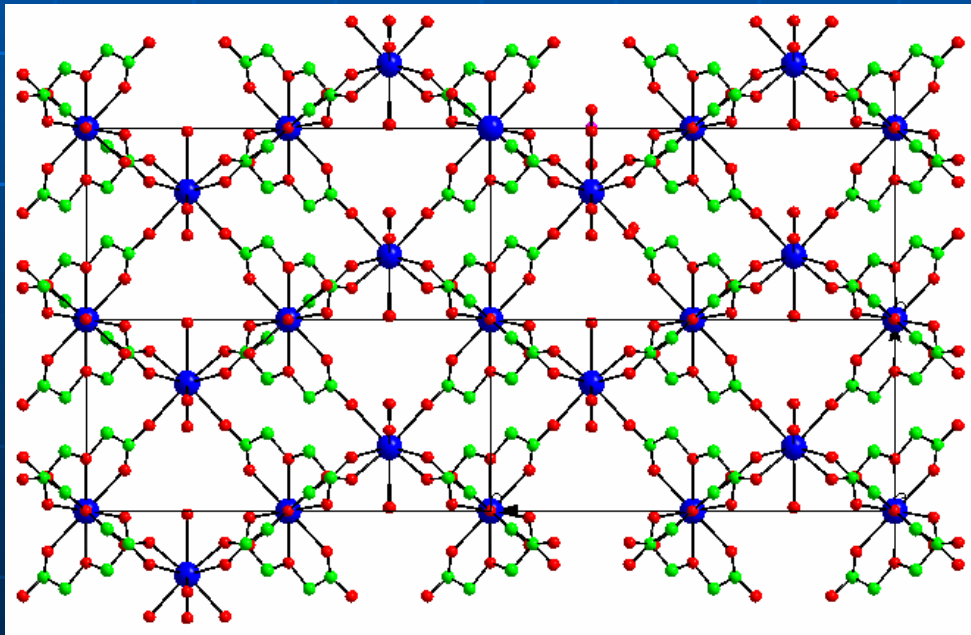
- General Theory
 - $n\lambda = 2d\sin\theta$
- Powder XRD
 - crystalline, rough size, peak positions, new material
- Single Crystal XRD
 - bonds, connectivity, exact structure



Characterization by XRD

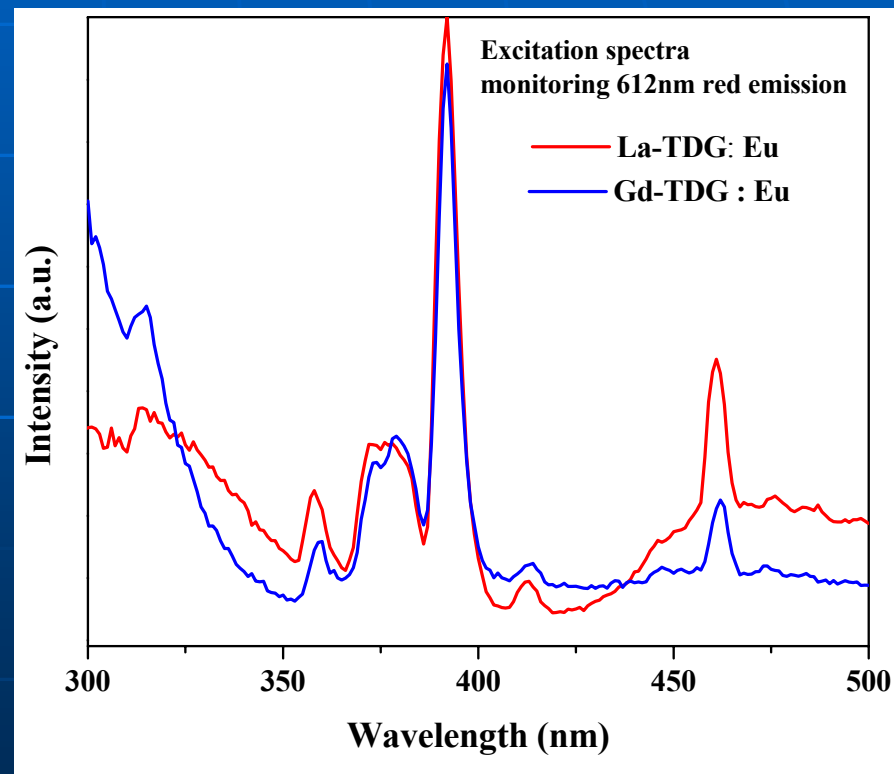
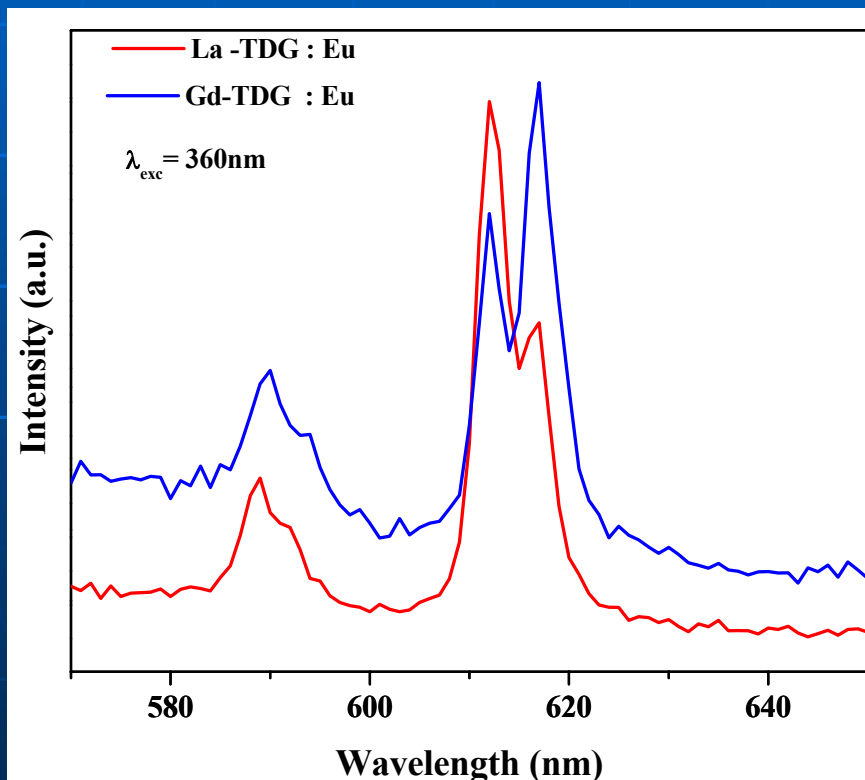


- Unit cell size (angstroms)
 $a=b=9.5301(6)$
 $c=17.4636(17)$



Photoluminescence Spectroscopy

Photoluminescence spectra of Eu-doped Rare-earth Thiodiglycolates



Continued Research

- Continue looking at other rare-earth metals and organic acids
- Determine their structure
- Test for thermal stability
- Explore possible applications for optical properties

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