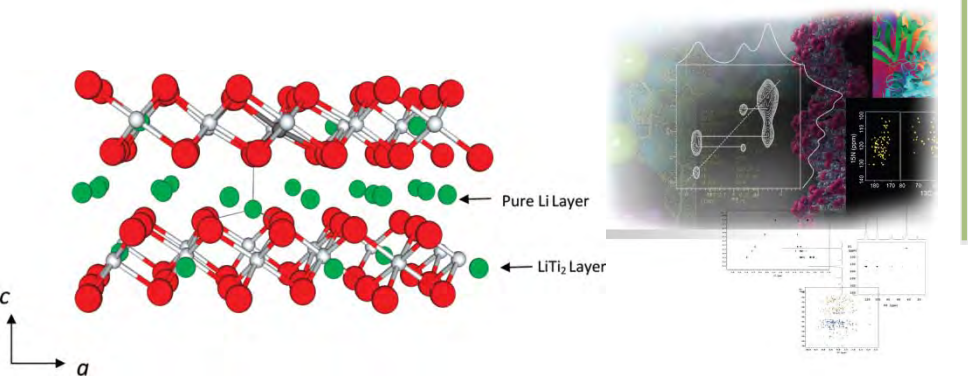
In Situ and Bioreactivity NMR probes

Capability/Need

- **Novel** probes designed/built by EMSL
- Probe development for second-generation (multinuclear) bioreactor/biofilm probes (ARRA#5 and #19) and second-generation *(higher field low frequency nuclei like Mg, Zn, Ti) in situ* catalysis probes for the new 850-wide-bore NMR (ARRA #20) are being built and tested.
- Allows **temperature extremes** (including novel cryo-magic angle spinning probe design)for examining metallo centers in synthetic and natural contexts

Science/Users

- *In situ* monitoring metabolic pathways of mixed microbial communities for renewable fuel production and bioremediation
- *In situ* **high-temperature and constant flow** probes for emissions control, energy storage and chemical interactions at complex surfaces



EMSL Strategy Alignment; Specifics

- Science themes: Biological Interactions/Dynamics; Geochemistry/Biogeochemistry and Subsurface Science; Science of Interfacial Phenomena
- Cross-cutting challenges: Static-Dynamics; Unprecedented Resolution; Design/Syn Complex Materials; Predict Biological Function
- EMSL capability area: NMR and EPR
- Anticipated availability: December 2010
- Technical POC: Dave Hoyt

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