NEW electron microprobe lab

JEOL JXA-8230

- NSF-MRI ~$1,000,000
- Installed in March 2016 (replace the JEOL-8600 EPMA, decommissioned today)
- Quantitative analysis of virtually any solid material at (sub)micron-scale
- Element: F to U (Be to O possible)

Open to internal & external researchers, and to industry / private users
Enhanced image resolution:

- 0.7-1.0 µm with W-filament
- NEW → 0.2-0.7 µm with LaB$_6$ / CeB$_6$

Old instrument (JEOL-8600, W) @ 15 keV

Work at low voltage now possible, aiming for sub-micron analytical volume)
- **10 mm² SSD EDS**
  - *light element down to Be*
  - *126 eV resolution @ Mn Kα*
- **Hyperspectral mapping**
- **Combination with WDS element mapping possible**
- **Full quantification (wt-%)**

**Phase map**

**EDS hyperspectral map ~10 min acquisition**

**Phase 3**

**EDS of phase 3**

**Kaolinite**

*Courtesy: D. Budd*
Al$_2$SiO$_5$: Trace Element Analysis

- 5 WDS, including 4 with large monochromators ➔ Trace element analysis, as low as 1-10 ppm range
- Panchromatic CL detector

<table>
<thead>
<tr>
<th>values in ppm</th>
<th>Mg K$_\alpha$</th>
<th>Ti K$_\alpha$</th>
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</thead>
<tbody>
<tr>
<td>Wt-% Min – max</td>
<td>48 – 142</td>
<td>40 – 120</td>
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<tr>
<td>Detection limit</td>
<td>4</td>
<td>11</td>
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<tr>
<td>Error (high - low)</td>
<td>5.9 - 2.1%</td>
<td>16.3 - 5.5%</td>
</tr>
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Conditions: 15 keV, 200 nA, 120 sec (peak)
• Highly improved software, **thin film** analysis and other **trace-oriented** or **beam-sensitive analyses** now possible!
• **Multi-user** facility with **online access (VPN + IP camera)**
  ➔ **Teaching & Remote analyses**
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Come & visit our lab this afternoon!
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