

14 October, 2002

## **SPECTROLASER APPLICATION**

### **BORON ANALYSIS IN GLASS AND COLEMANITE**

#### **MATERIAL**

Two glass samples and one colemanite sample were received from a multi-national glass manufacturer's plant in South Africa for analysis with the Spectrolaser 1000M.

#### **ANALYSIS METHOD**

The glass samples were ground to <60 microns with a Rocklabs ringmill prior to analysis while the colemanite sample was analysed without additional preparation. Sub-samples of each material were pressed using the LAT 40T hydraulic press and analysed using the Spectrolaser 1000M using 100 laser pulses – corresponding to a 20 second analysis time. Single point calibration using nominal Boron concentrations were used in combination with multiple sample runs (6) to yield the precision of the Boron measurement in these materials.

#### **DETECTABLE ELEMENTS**

Detectable elements in the materials include principal components such as Si, Al, Ca, Mg, Na, Li, Ti, Fe, O and various trace components.

The detection limit for B is estimated at 0.01% in this material based on observed signal-to-noise ratio.

## ***MULTIPLE ANALYSIS TESTS***

1. Small bead glass samples. Nominal B<sub>2</sub>O<sub>3</sub> concentration 5.5%

Analysis	B <sub>2</sub> O <sub>3</sub> (%)
1	5.4
2	5.6
3	5.5
4	5.5
5	5.4
6	5.6
<b>Average</b>	<b>5.5</b>
SD	0.1
<b>Nominal Value</b>	<b>5.5</b>

2. Large pieces of glass. Nominal B<sub>2</sub>O<sub>3</sub> concentration 4.5%

Analysis	B <sub>2</sub> O <sub>3</sub> (%)
1	4.6
2	4.6
3	4.5
4	4.5
5	4.6
6	4.6
<b>Average</b>	<b>4.6</b>
SD	0.1
<b>Nominal Value</b>	<b>4.5</b>

3. Colemanite. Nominal B<sub>2</sub>O<sub>3</sub> concentration 47.8 %

Analysis	B <sub>2</sub> O <sub>3</sub> (%)
1	48.1
2	47.4
3	47.7
4	45.6
5	49.3
6	48.7
<b>Average</b>	<b>47.8</b>
SD	0.52
<b>Nominal Value</b>	<b>47.8</b>

Example spectrum displaying observed boron emission at 208.95 and 249.77 nm in glass sample containing nominally 4.5% boron.

