BACKGROUND

- Chondrules are melt spherules in the matrix of chondrites.
- Consist of olivine and pyroxene grains, in a mesostasis of feldspar composition.
- Original classification schemes involve olivine composition (type I and II, FeO poor and FeO rich olivine) and mineralogy (A, mostly olivine; B, mostly pyroxene; and AB, an intermediate mix of both olivine and pyroxene).
- Sears et al. 1992 proposed a new scheme based on cathodoluminescence (CL). Bright CL = class A, little or no CL = class B, with subdivision into A1-5 and B1-3.
- Expressing the CL classes in terms of mineral and phases composition has proved difficult and Sears (1992) received criticism from Scott et al. (1994) and Grossman and Brearley (2005).

CATHODOLUMINESCEENCE CLASSIFICATION

- Based on CL color/intensity which relate to composition (Figs. 1 and 2).
- Mesostasis and olivine grains analyzed and plotted.

OLIVINE DATA

- Plot CaO vs. FeO.
- Improved boundaries to be more inclusive.
- Boundaries based on data.
- Figure 3 shows original and revised plot.

MESOSTASIS DATA

- Ternary diagram of quartz, albite, and anorthite calculated from wt% oxides using CIPW norm.
- Lu Jie (1990), Hutchison/Alexander (1995) and DeHart (1992) have similar data disbursement.
- Analytical conditions similar for all authors.

DISCUSSION

- If the DeHart (1992) data are deficient in sodium, then a solution would be to lower the boundaries.
- However, it is also possible that the Grossman/Brearley (2005) data are not representative of the CL classes.

CONCLUSIONS

- Current data are not adequate to change the boundaries of the mesostasis ternary diagram, nor claim that the current boundaries are correct.
- I suggest that probe conditions should be identified in which Na loss is known not to be occurring and CL classified chondrules should be analyzed.

REFERENCES