Appendix A
Comparison of the Murchison CM2 and Allende CV3 Chondrites
Kim V. Fendrich and Denton S. Ebel

Fig A1: Compositions of Murchison objects, Mg vs. Al (wt%). The bulk composition measured by Jarosewich (1990) is indicated by a green diamond. The calculated Mg/Al ratio in MgAl2O4 spinel is indicated. "ISO" are isolated pyroxene and olivine fragments in matrix.

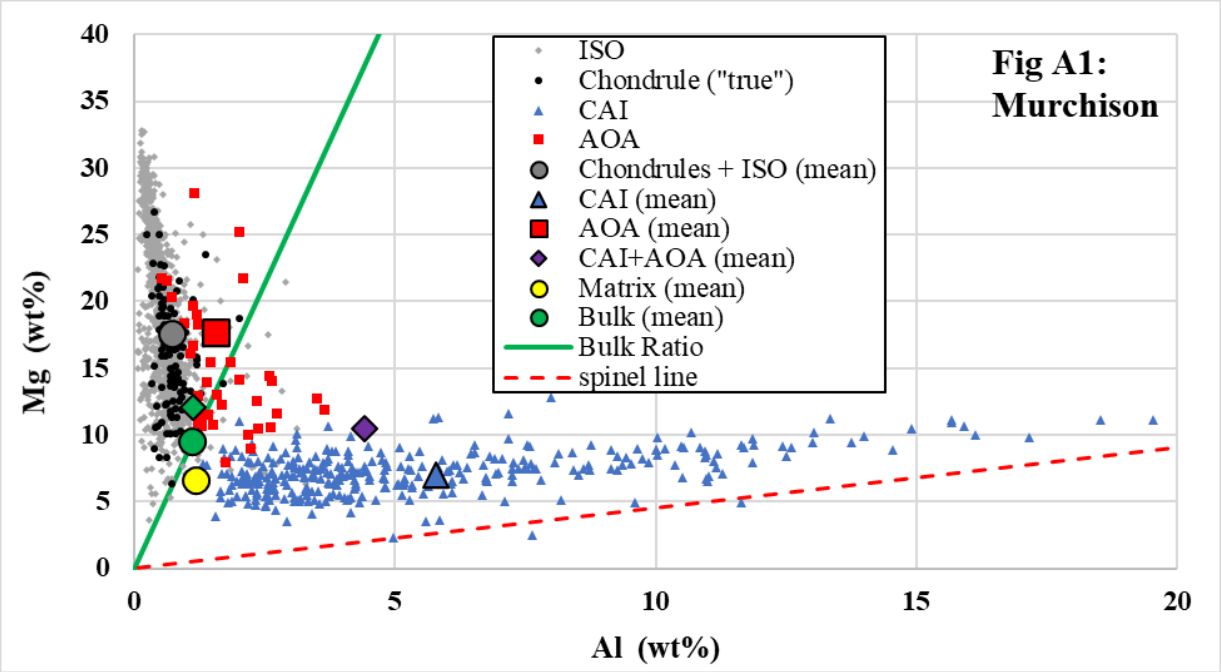
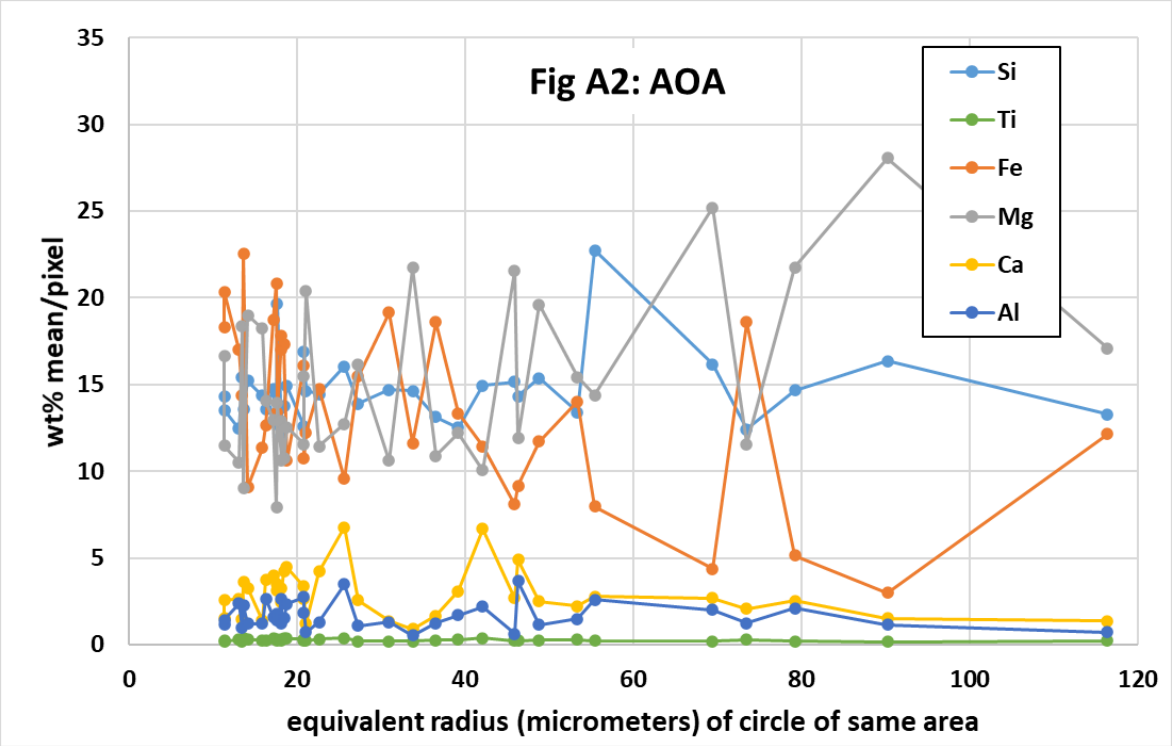


Fig A2: Apparent size of objects vs. observed compositions (wt%/pixel) for AOAs, CAIs and "true" chondrules in Murchison 4377-t1-ps8A, illustrating lack of correlation between size and chemistry. High Fe contents in CAIs and AOAs reflect the fact that both Allende and Murchison are strongly altered. Fe is highly mobile in both meteorites. Almost no primary Fe-Ni alloy (metal) is found in either meteorite and then only when "armored" by chondrule olivine. Finer-grained and smaller CAIs and AOAs are more susceptible to alteration. We expect that CAIs are more susceptible than AOAs, forming secondary Fe-rich minerals, such as hercynite replacing grossite or hibonite, as reviewed by Brearley and Jones (1998), who reviewed the secondary mineralogy of CAIs and other inclusions in all chondrite groups.



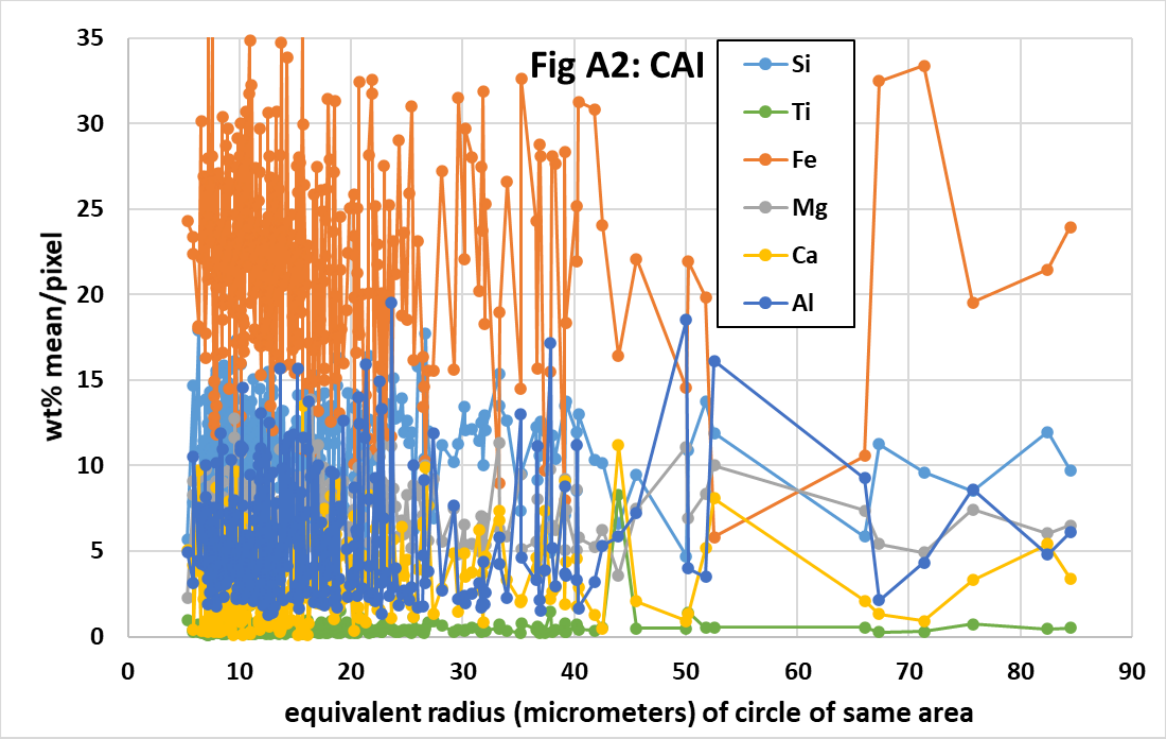


Fig A2: CAI
Si
Ti
Fe
Mg
Ca
Al
wt% mean/pixel
0
5
10
15
20
25
30
35
0
10
20
30
40
50
60
70
80
90
equivalent radius (micrometers) of circle of same area

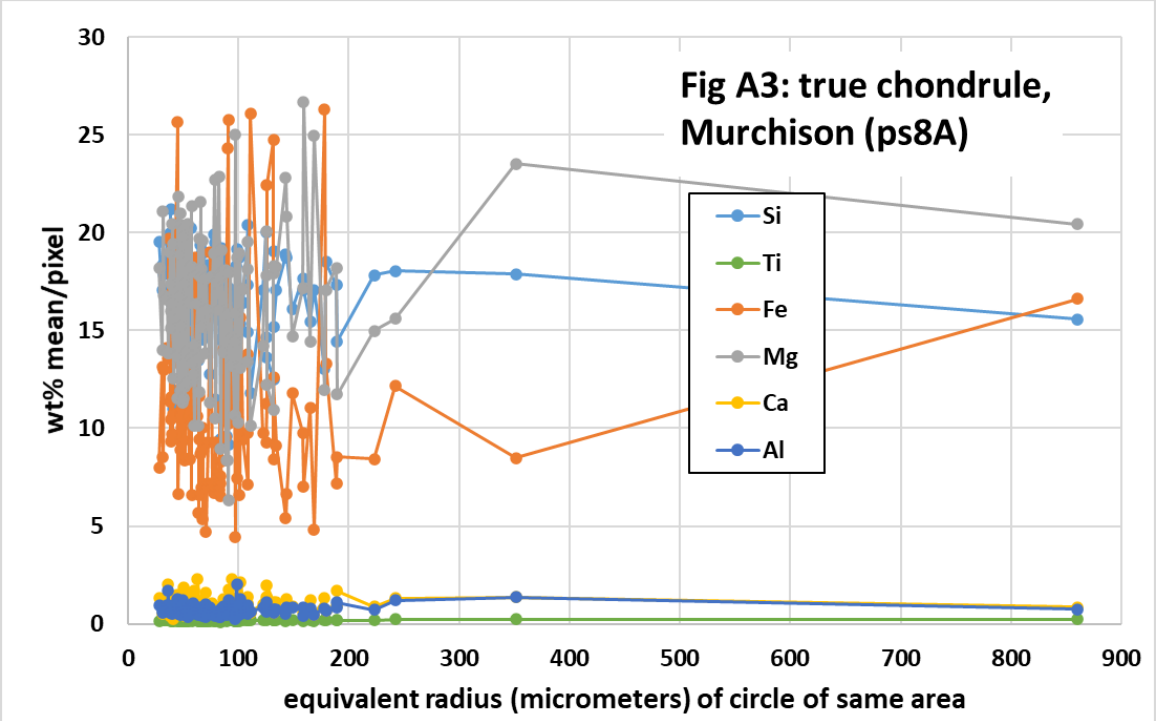


Fig A3: true chondrule, Murchison (ps8A)
Si
Ti
Fe
Mg
Ca
Al
wt% mean/pixel
0
5
10
15
20
25
30
0
100
200
300
400
500
600
700
800
900
equivalent radius (micrometers) of circle of same area

Fig A3: Compositions of Allende objects, Mg vs. Al (wt%). The calculated Mg/Al ratio in MgAl2O4 spinel is indicated. "ISO" are isolated pyroxene and olivine fragments in matrix.

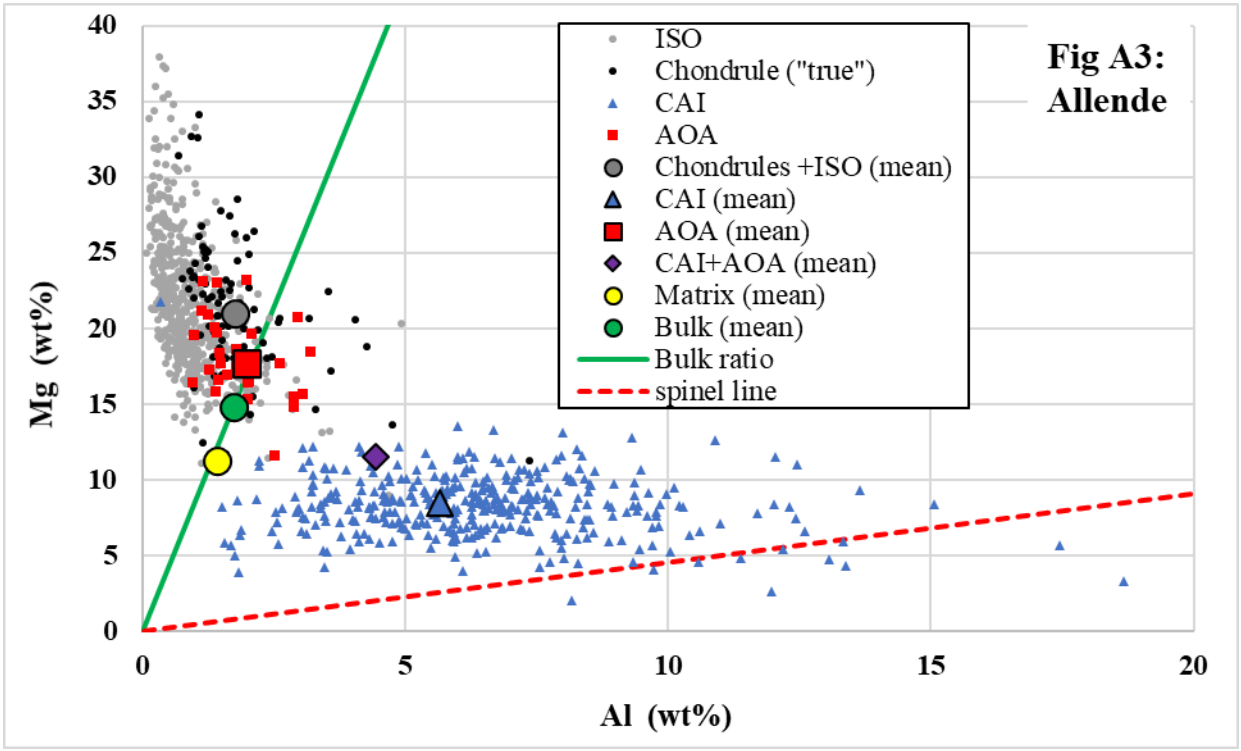
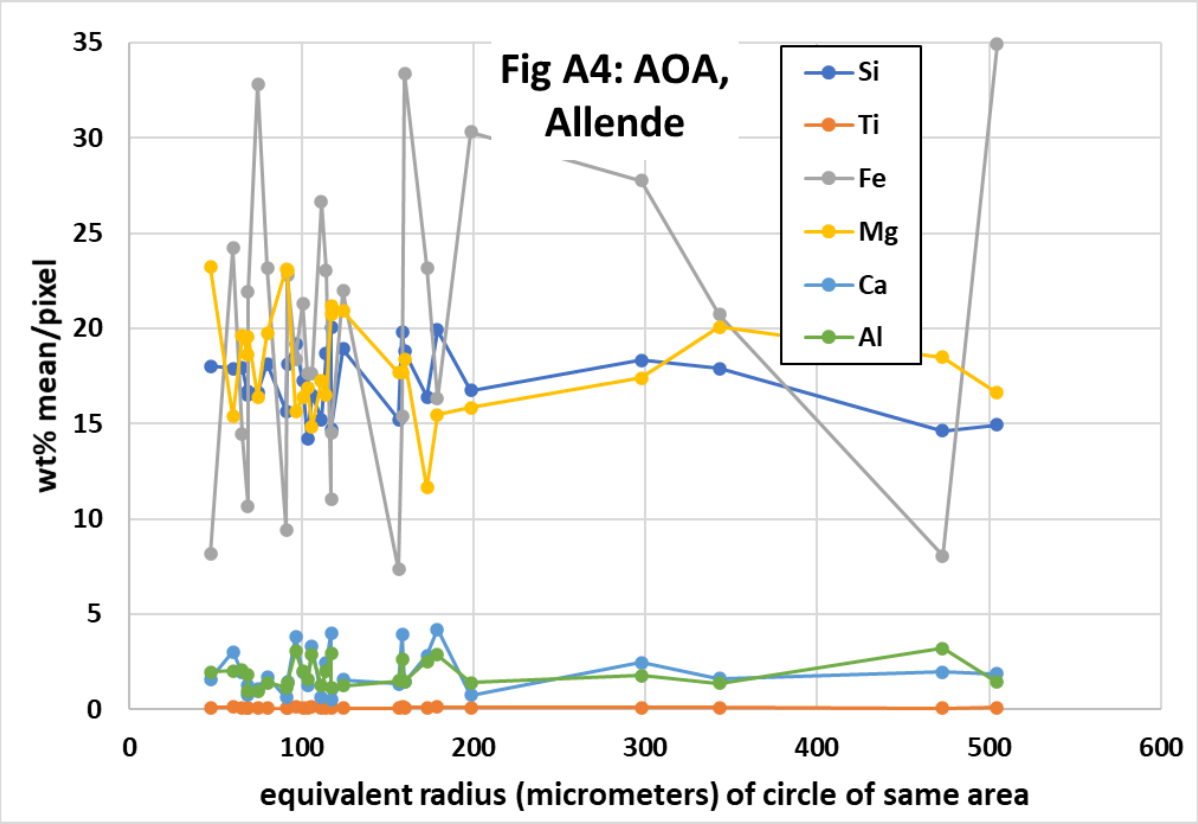


Fig A4: Apparent size of objects vs. observed compositions (wt%/pixel) for AOAs, CAIs and "true" chondrules in two Allende sections, illustrating lack of correlation between size and chemistry. The plot for CAIs has been adapted for clarity. High Fe contents in CAIs and AOAs reflect the fact that both Allende and Murchison are strongly altered. Fe is highly mobile in both meteorites. Almost no primary Fe-Ni alloy (metal) is found in either meteorite and then only when "armored" by chondrule olivine. Finer-grained and smaller CAIs and AOAs are more susceptible to alteration. We expect that CAIs are more susceptible than AOAs, forming secondary Fe-rich minerals, such as hercynite replacing grossite or hibonite, as reviewed by Brearley and Jones (1998), who reviewed the secondary mineralogy of CAIs and other inclusions in all chondrite groups.



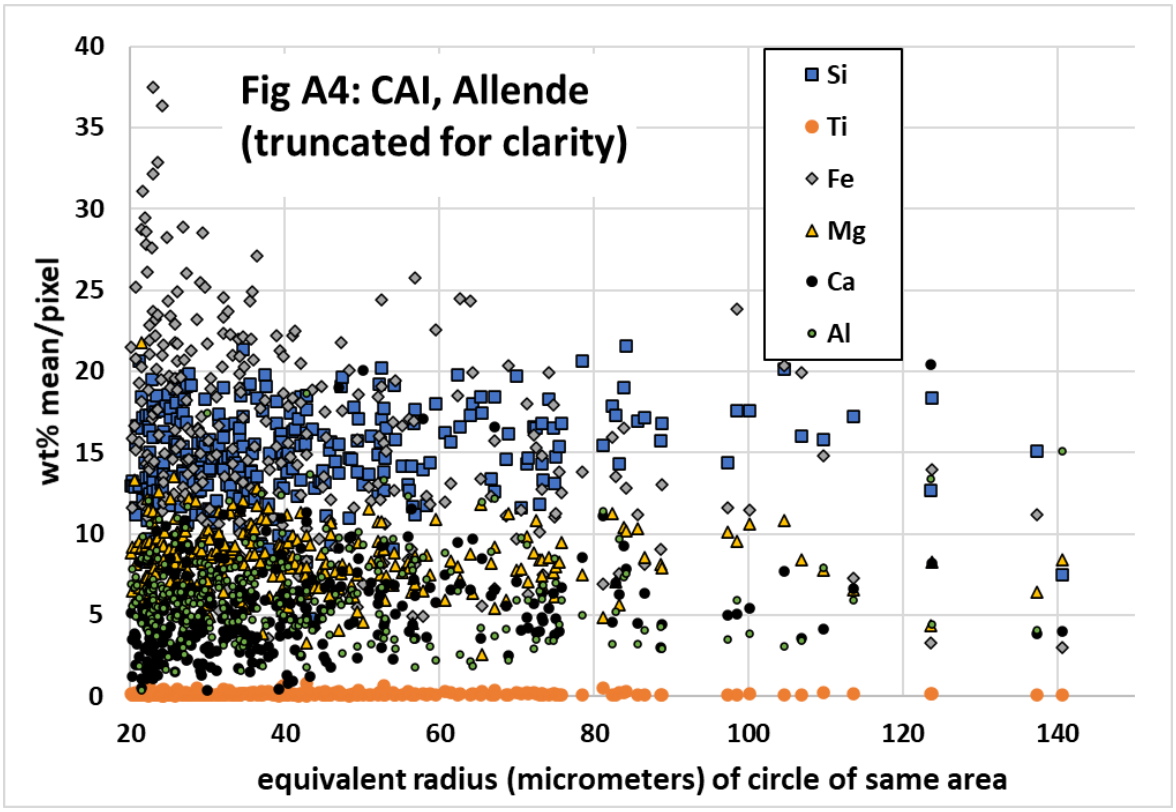


Fig A4: CAI, Allende
(truncated for clarity)
Si
Ti
Fe
Mg
Ca
Al
wt% mean/pixel
0
5
10
15
20
25
30
35
40
20
40
60
80
100
120
140
equivalent radius (micrometers) of circle of same area

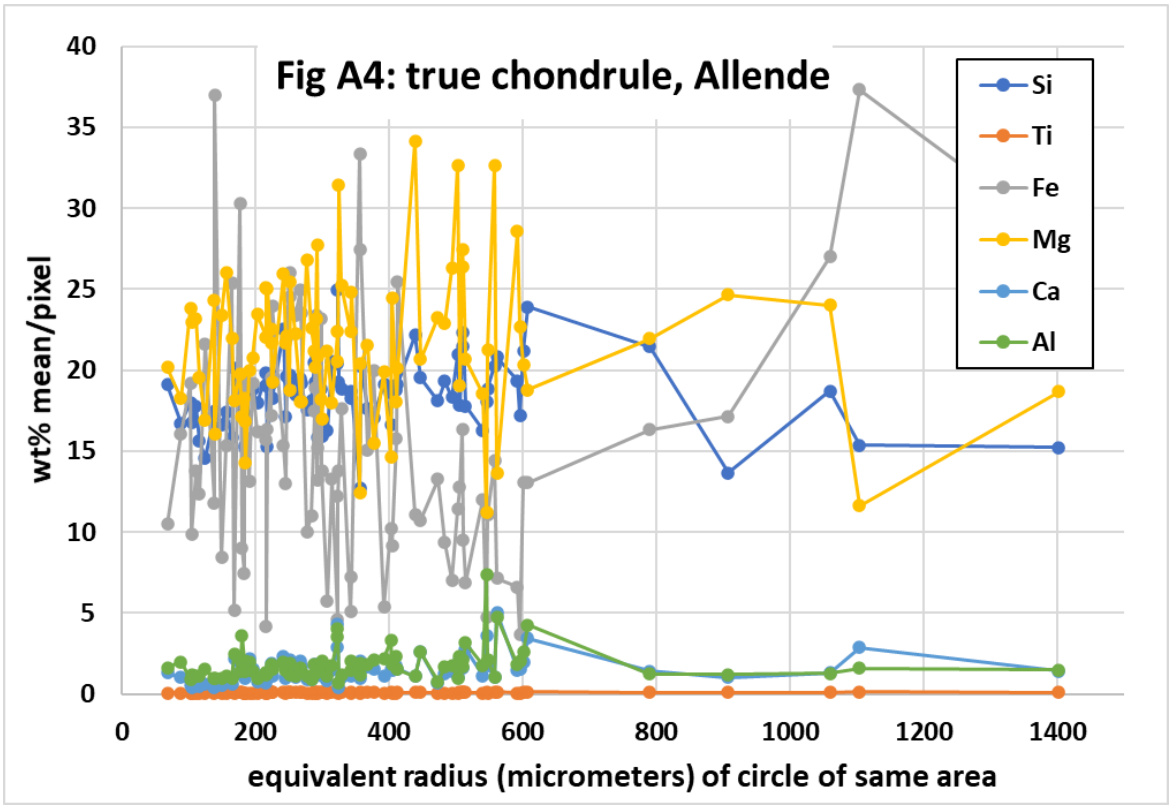


Fig A4: true chondrule, Allende
Si
Ti
Fe
Mg
Ca
Al
wt% mean/pixel
0
5
10
15
20
25
30
35
40
0
200
400
600
800
1000
1200
1400
equivalent radius (micrometers) of circle of same area