

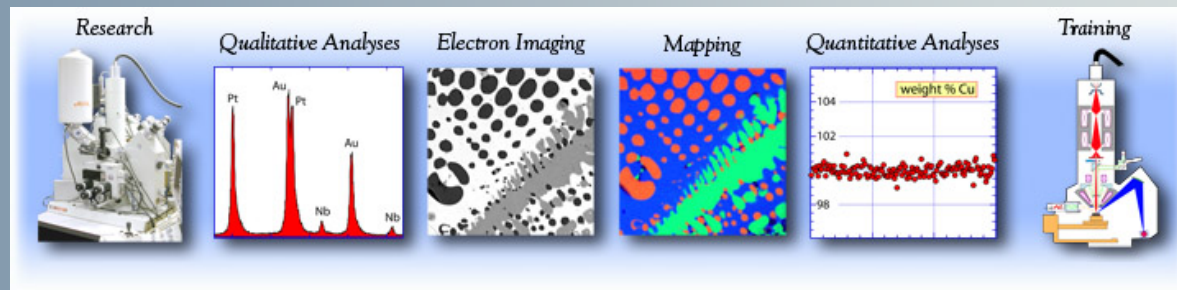
Duluth Complex

Magnetite Fraction

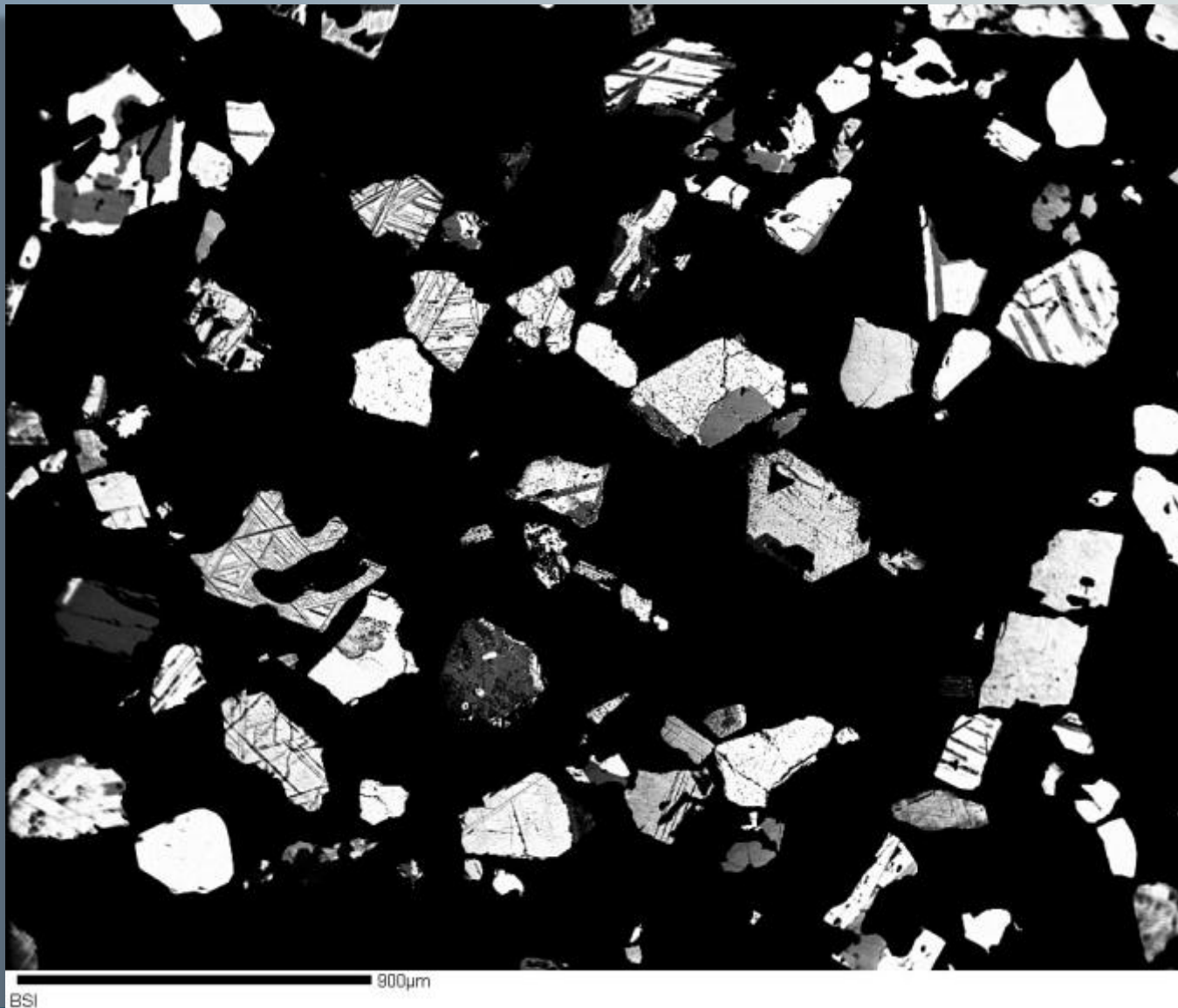
Electron Microprobe Analyses

Electron Microprobe Analyses
June 30, 2013

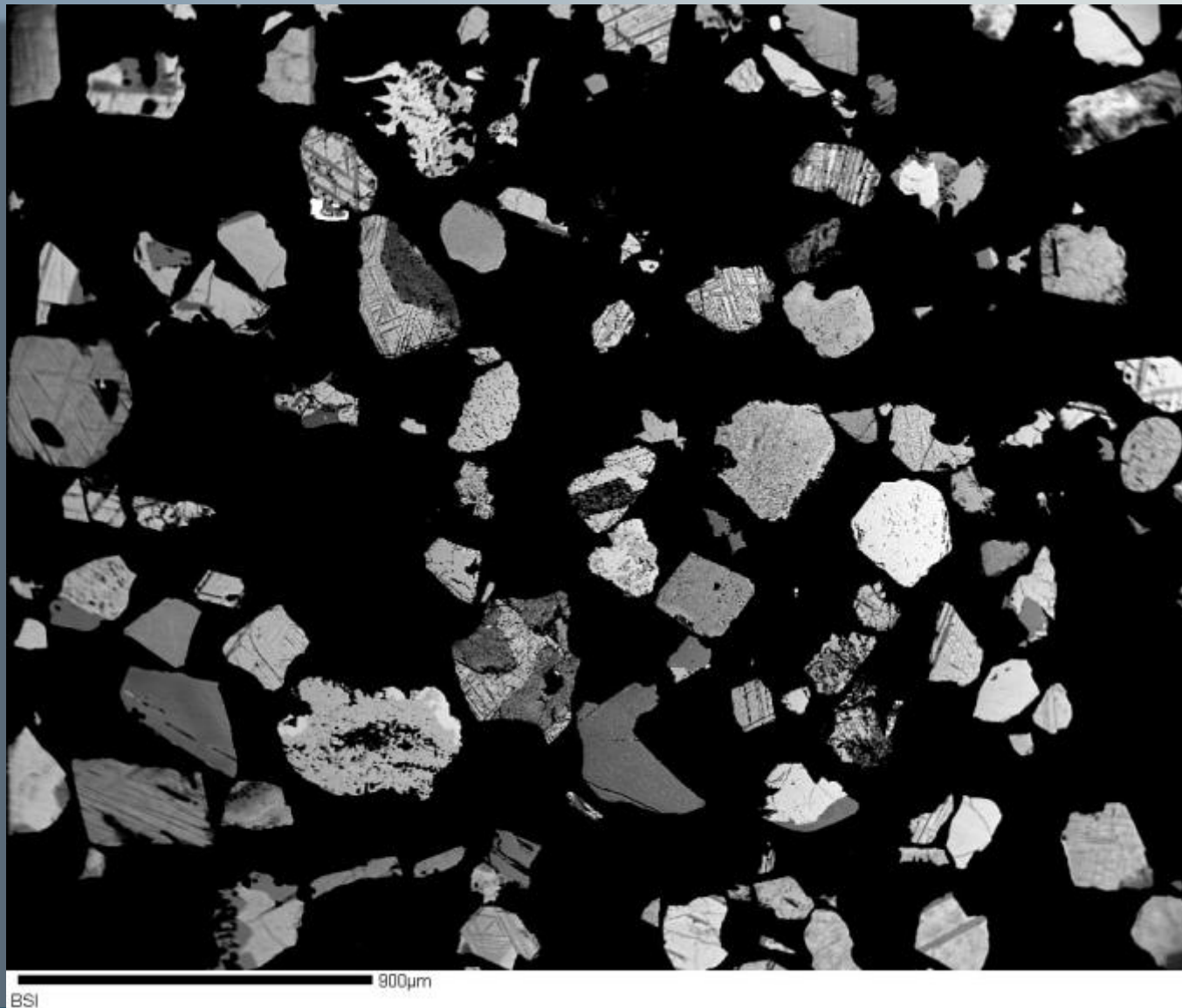
Peter McSwiggen
McSwiggen & Associates



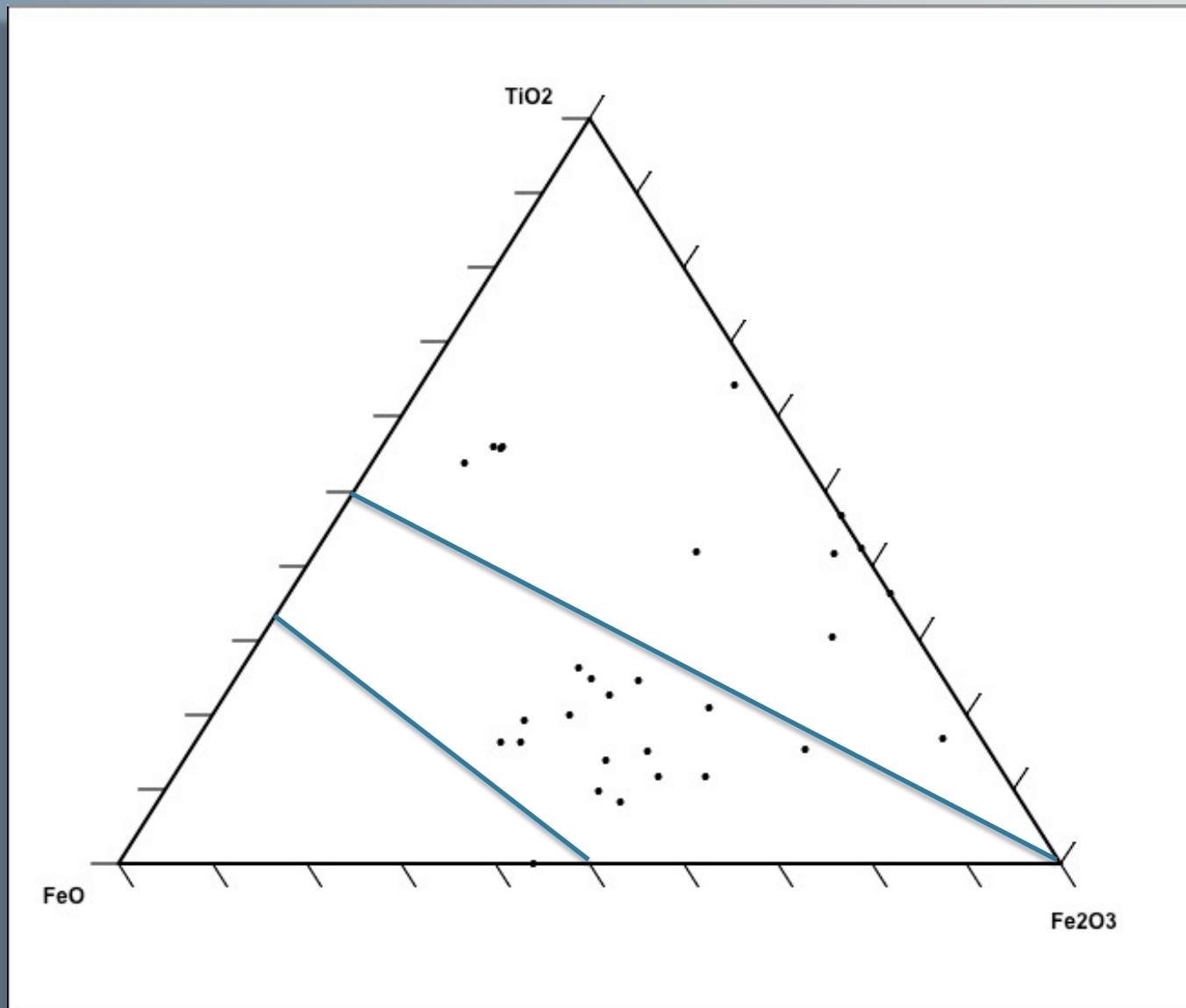
Sample Overview



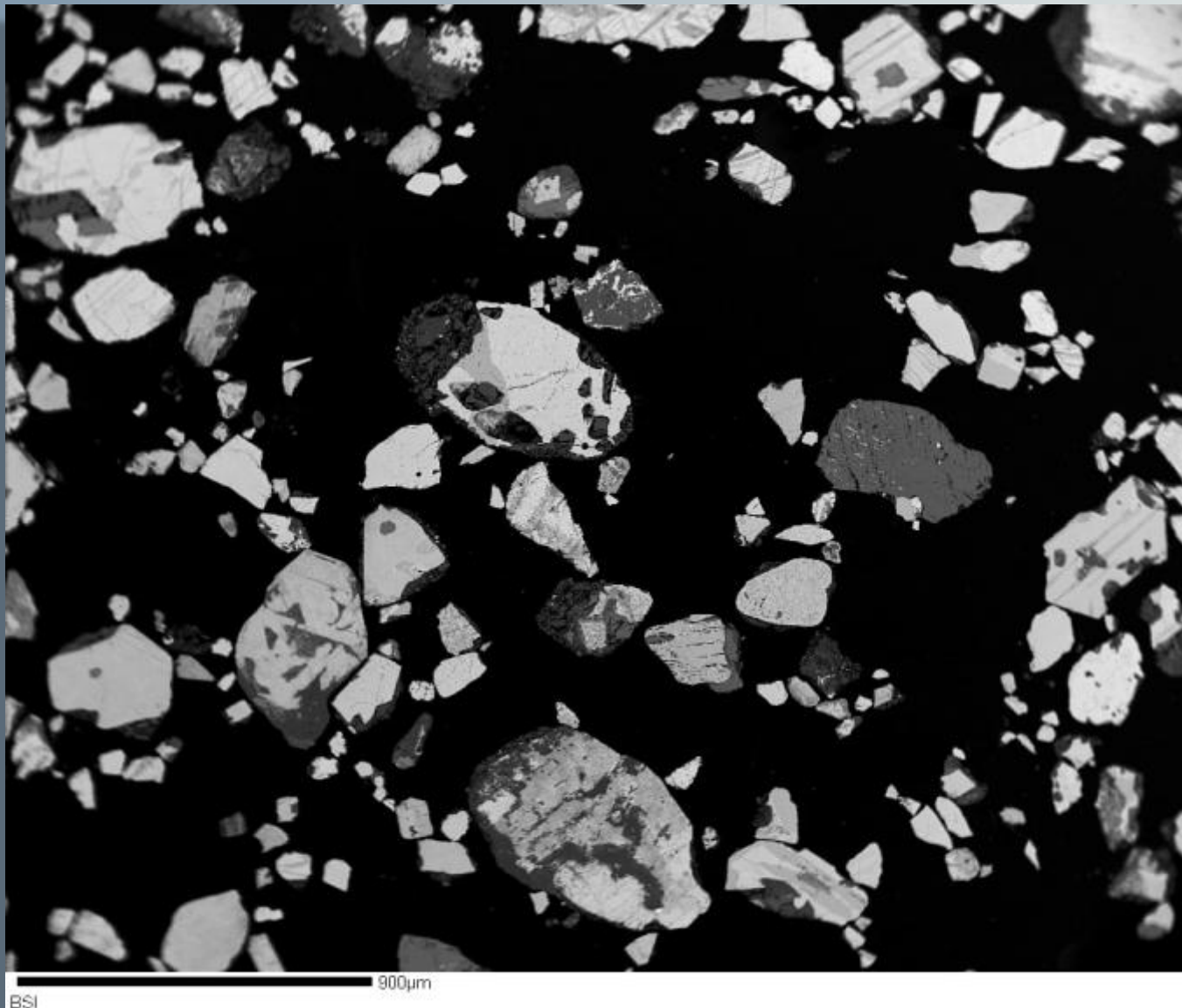
Sample Overview



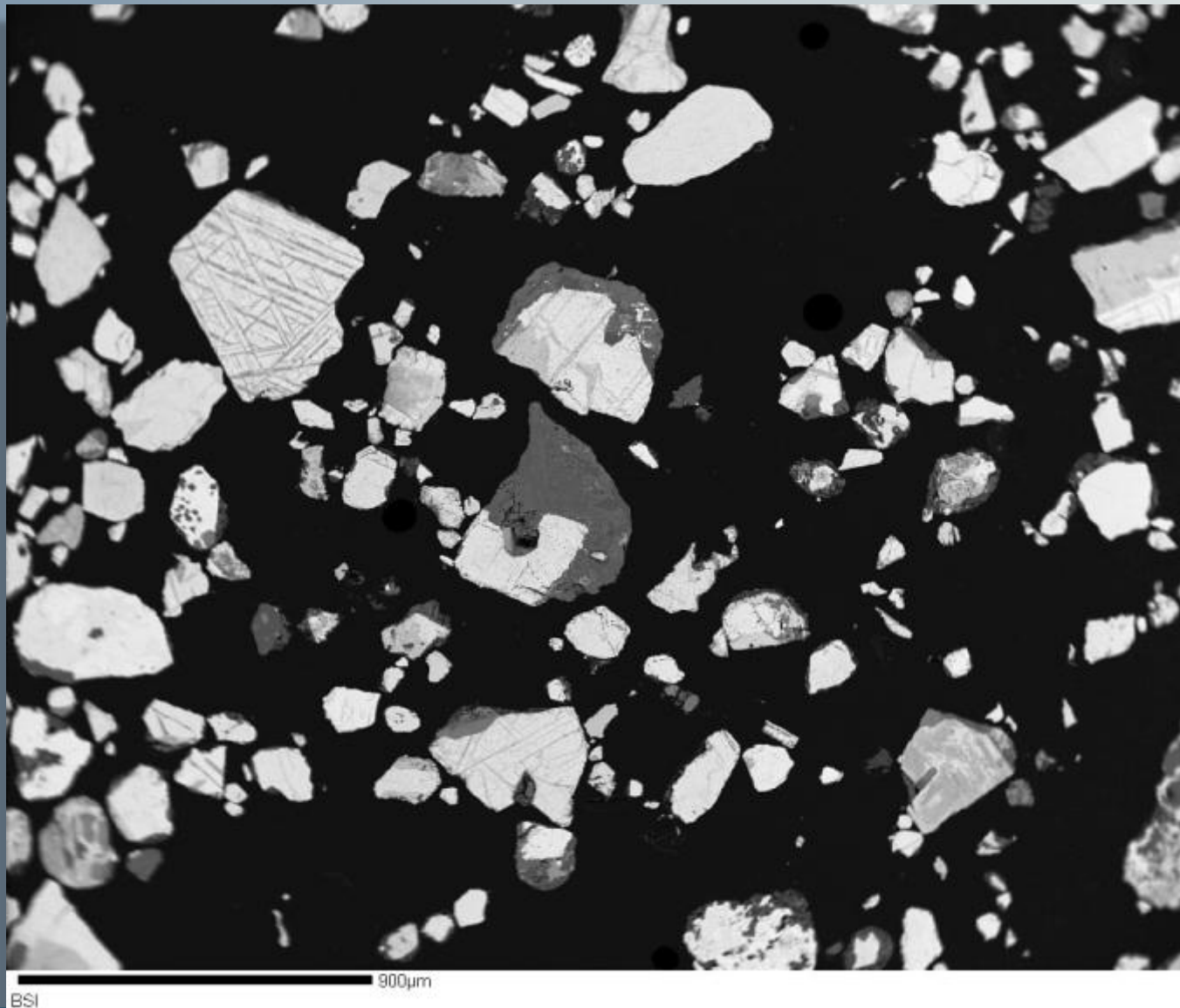
Oxide Chemistry



Sample Overview



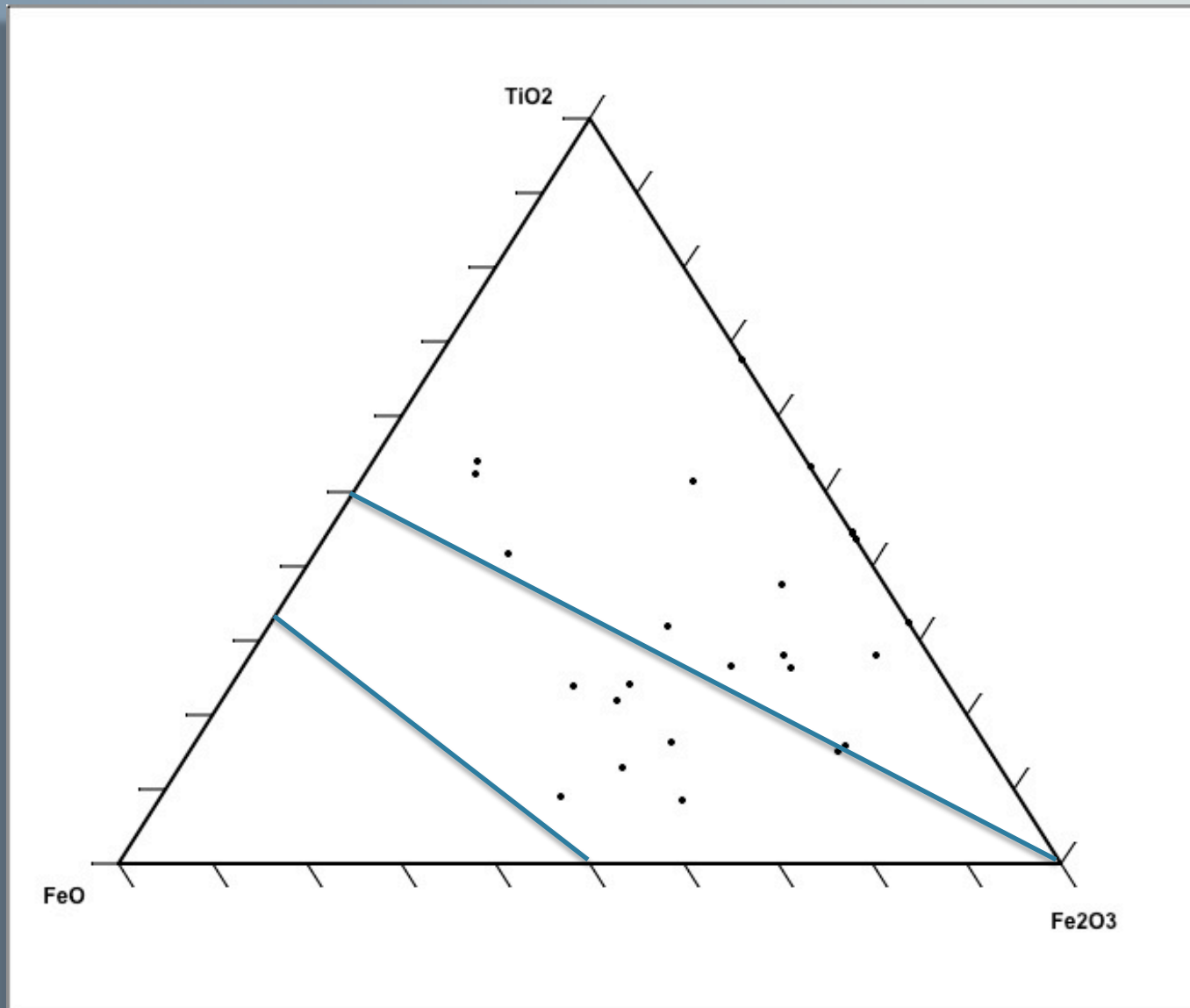
Sample Overview



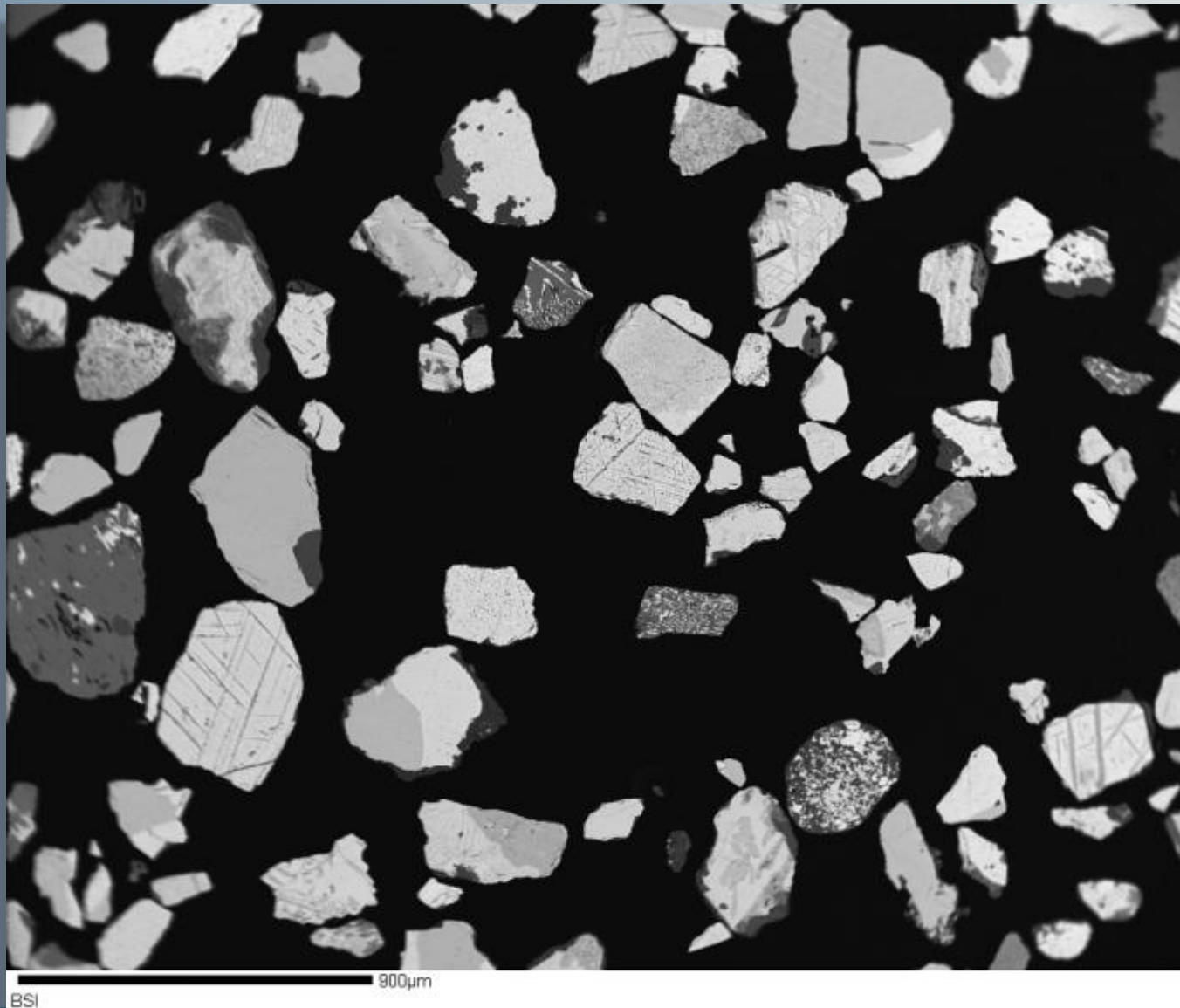
BSI

900µm

Oxide Chemistry



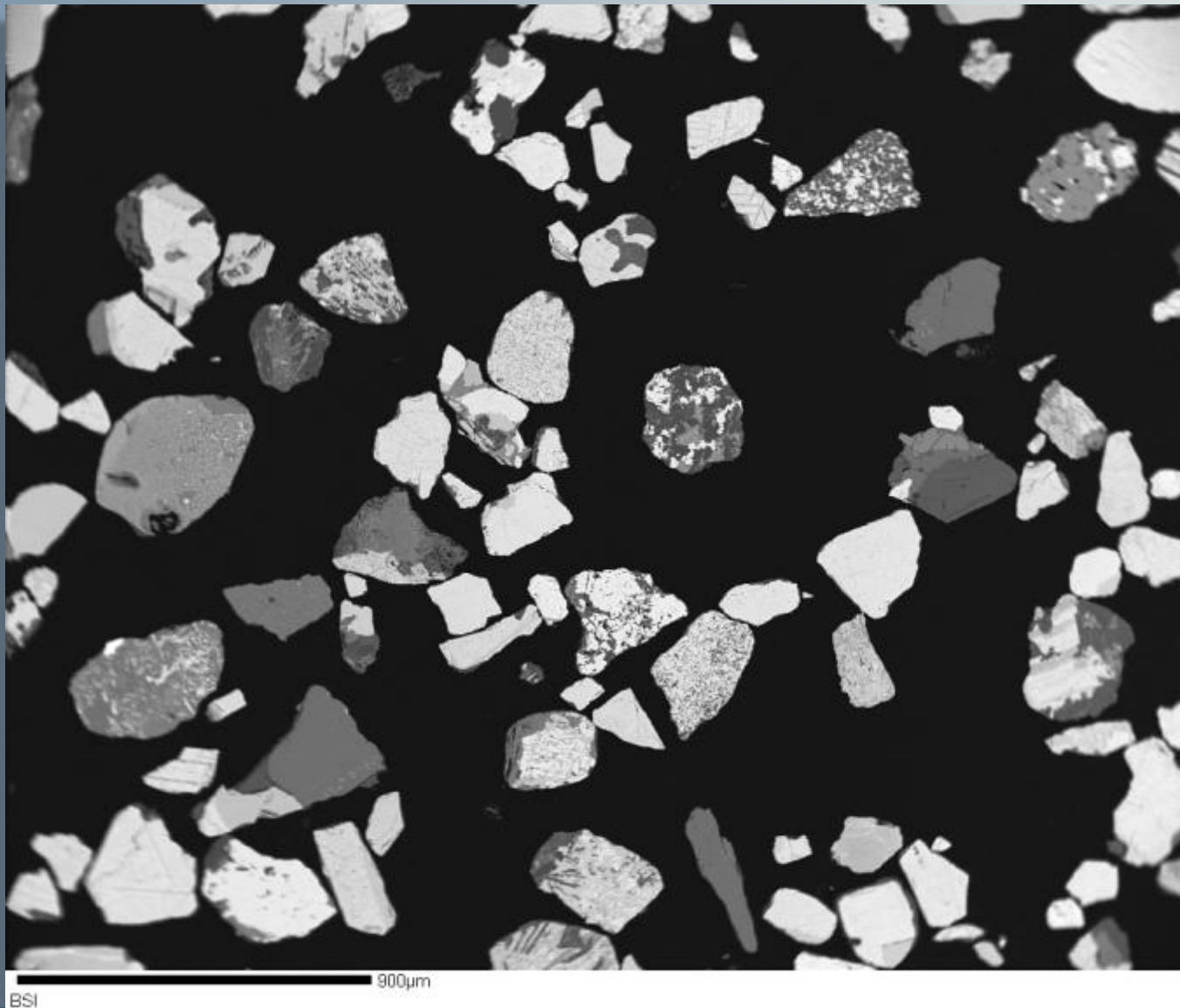
Sample Overview



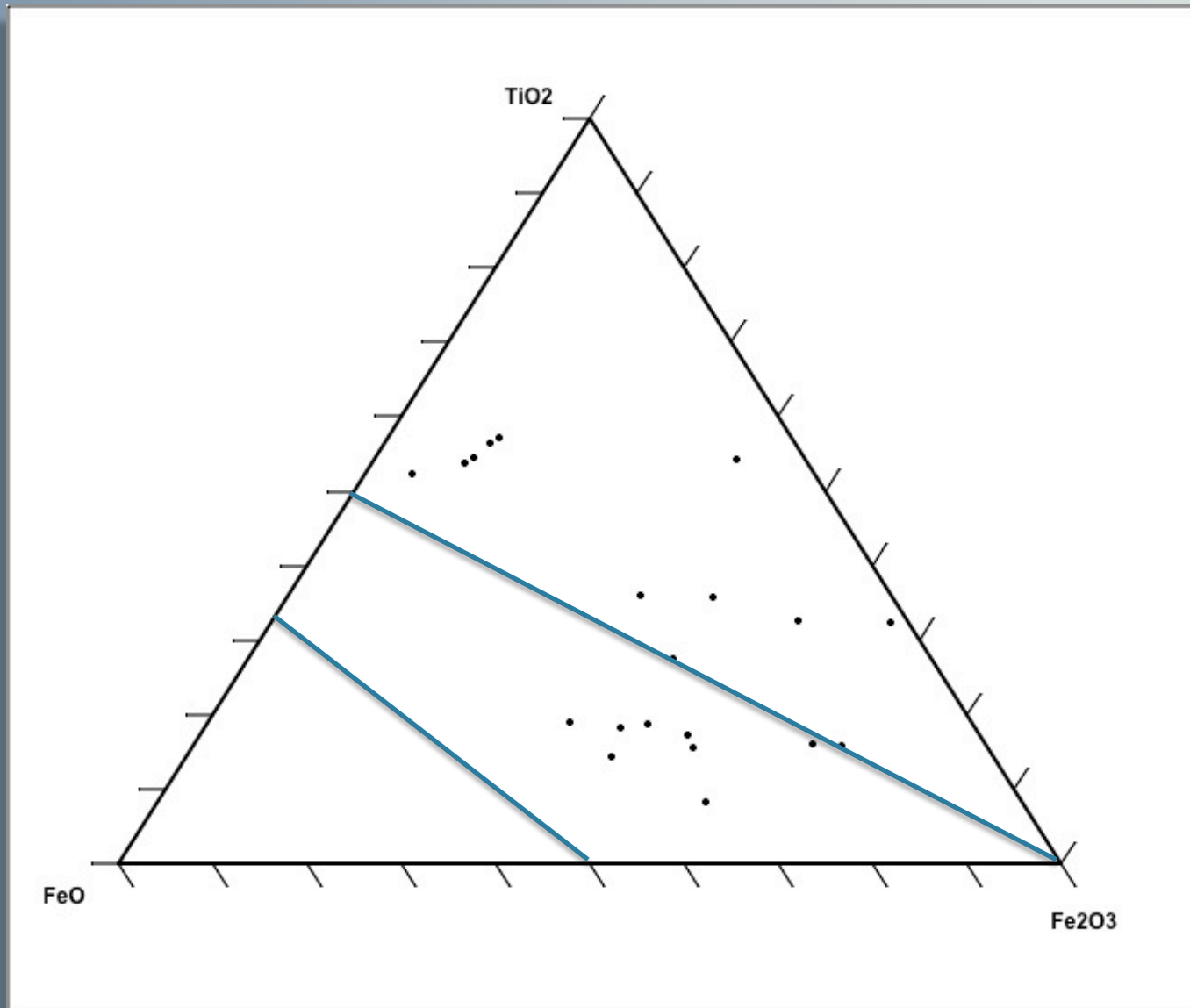
BSI

900µm

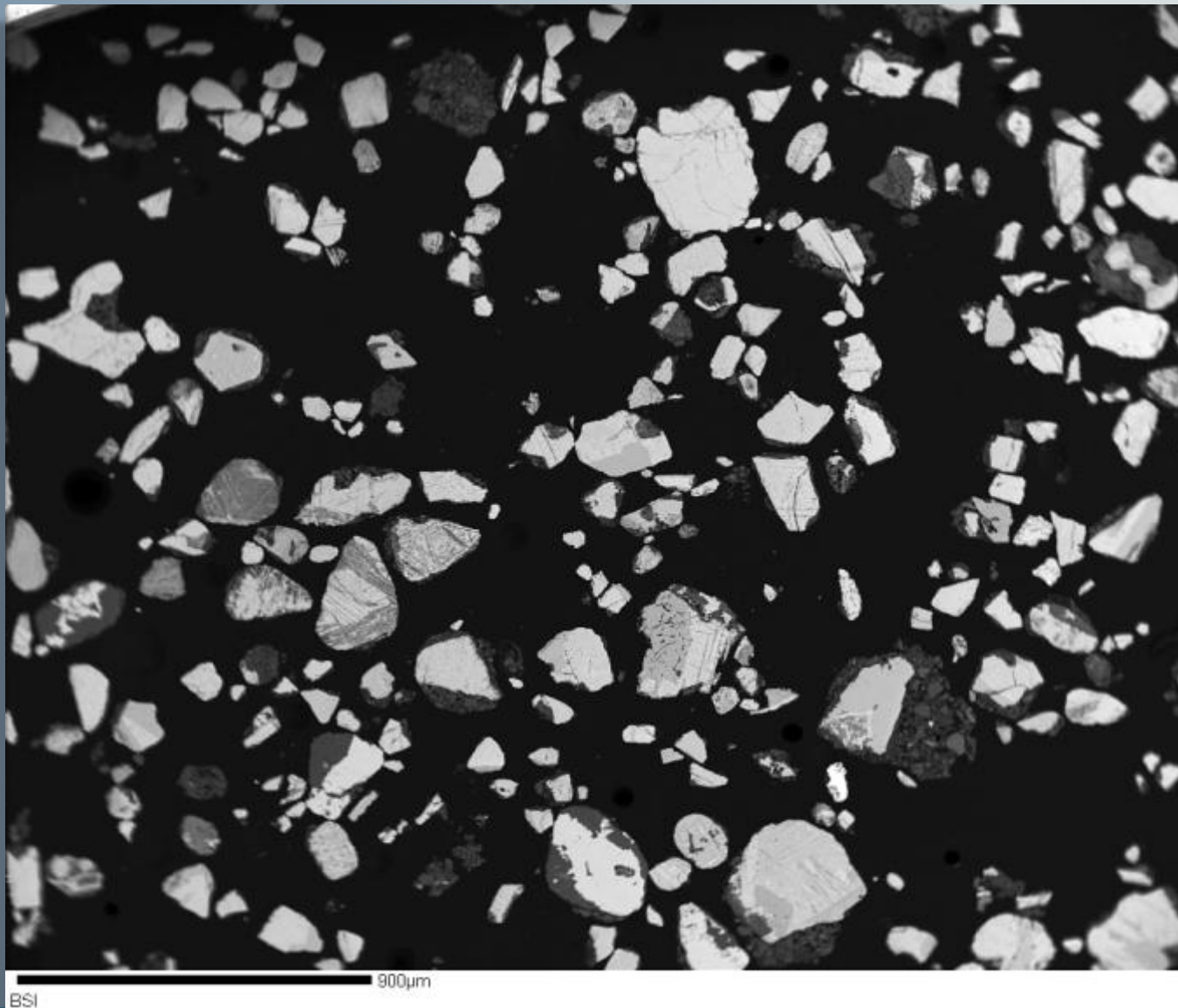
Sample Overview



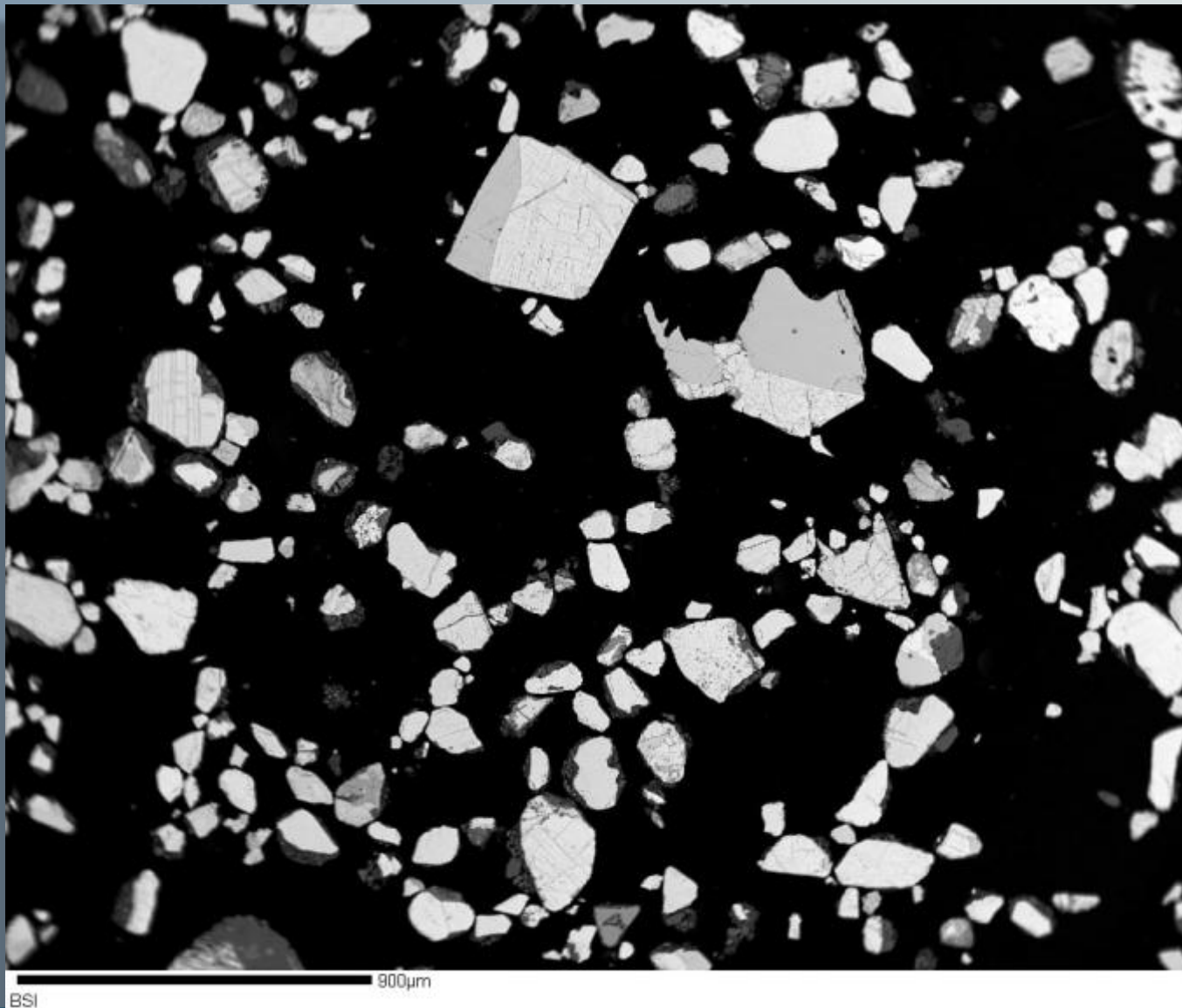
Oxide Chemistry



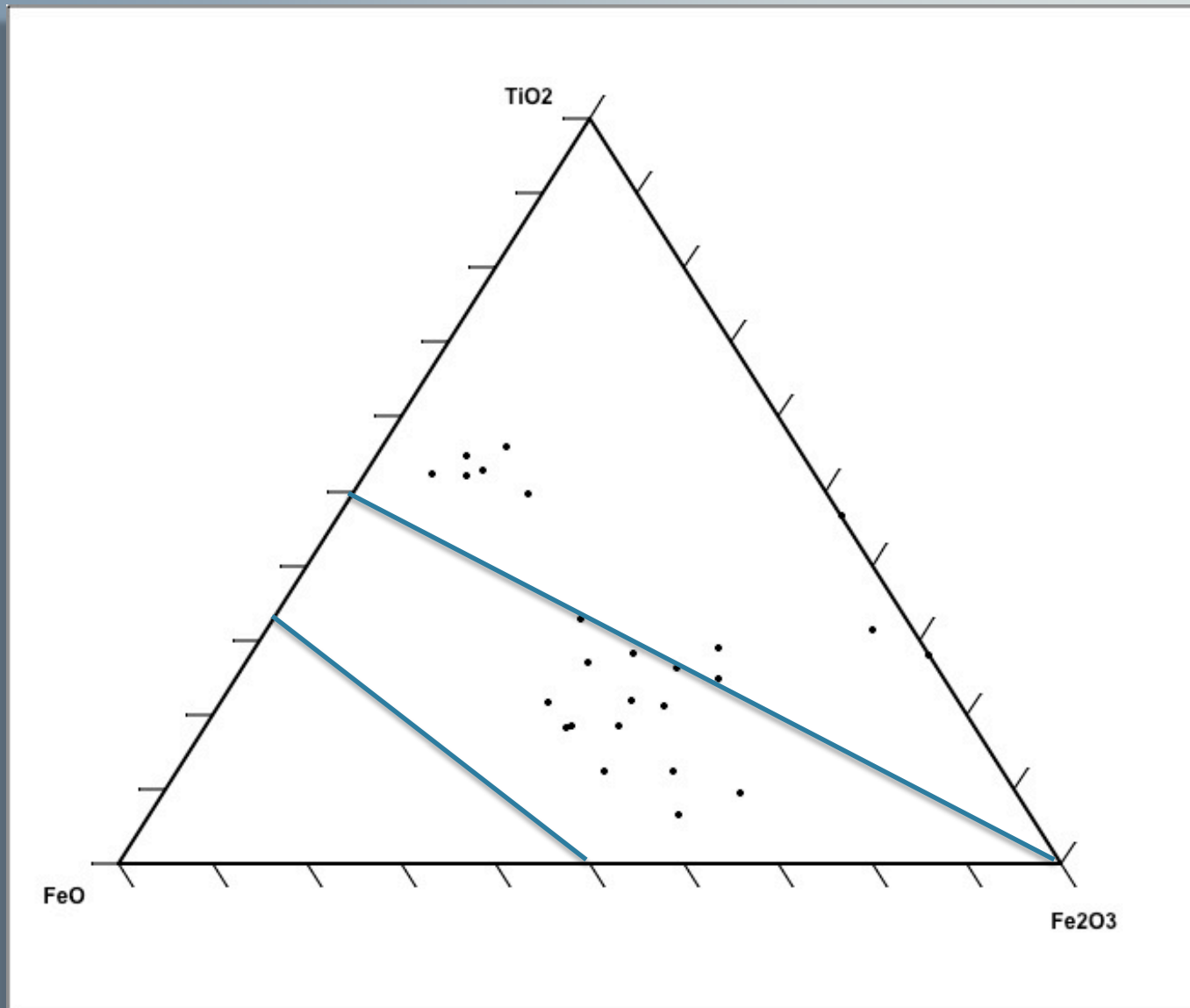
Sample Overview



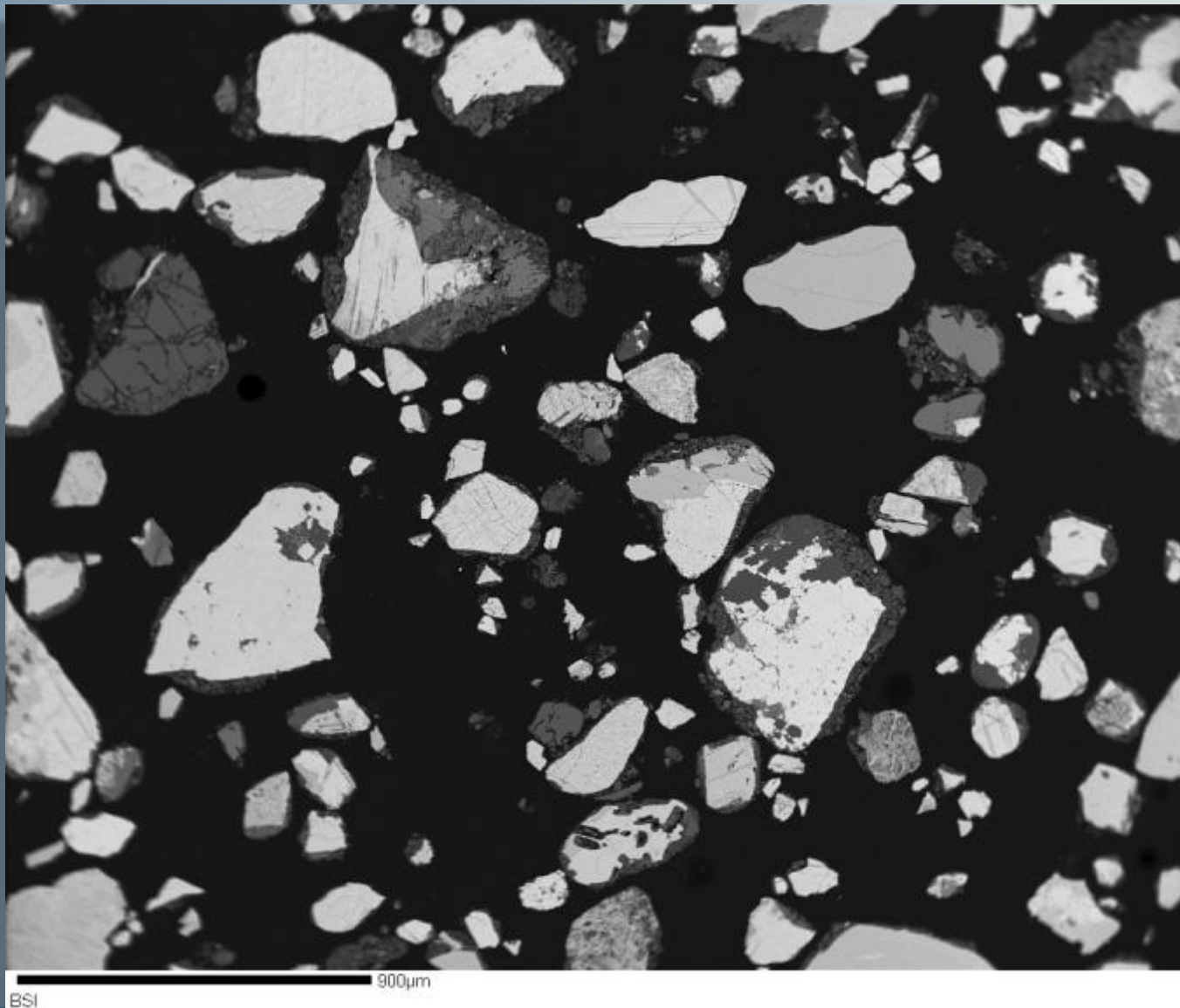
Sample Overview



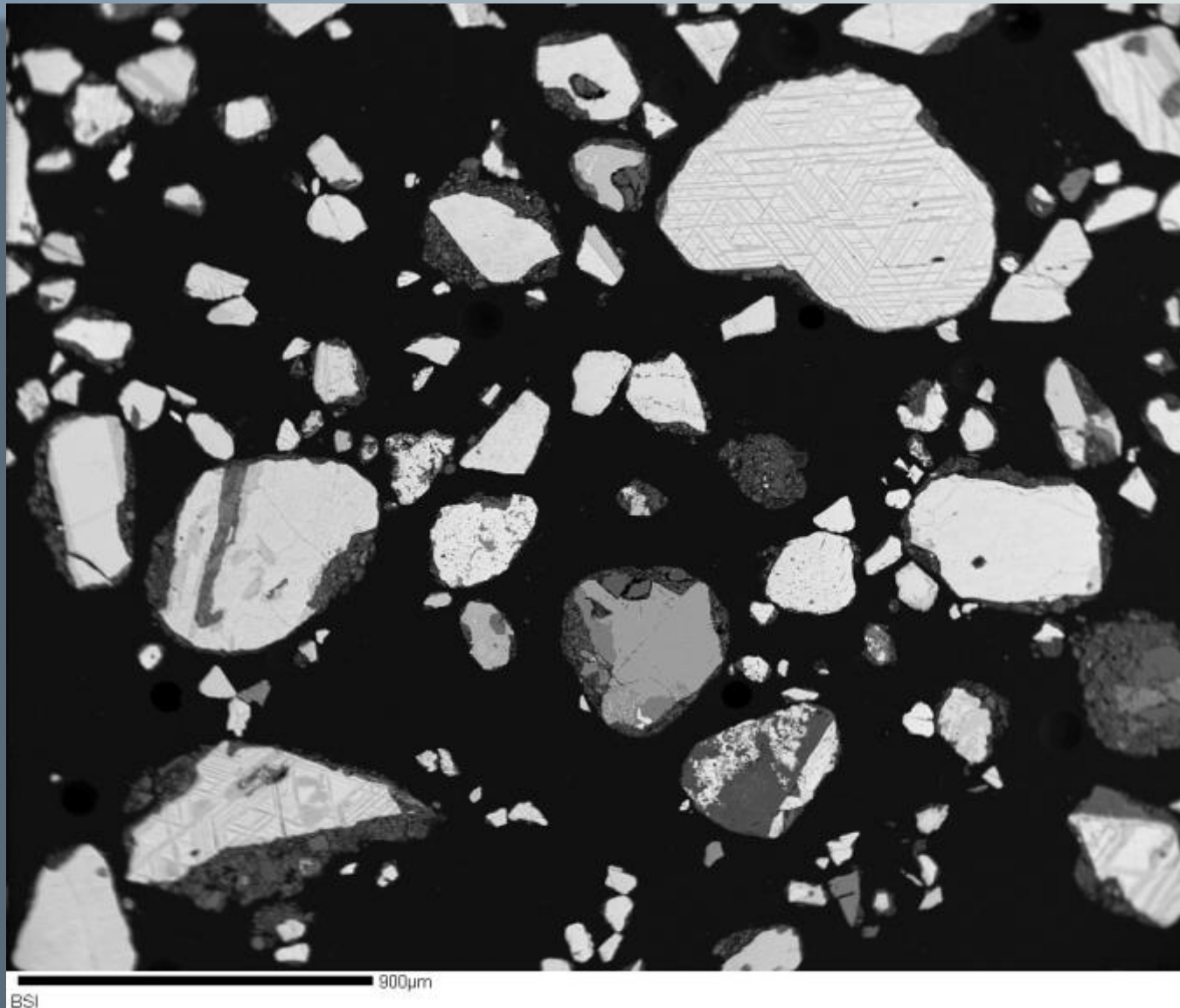
Oxide Chemistry



Sample Overview



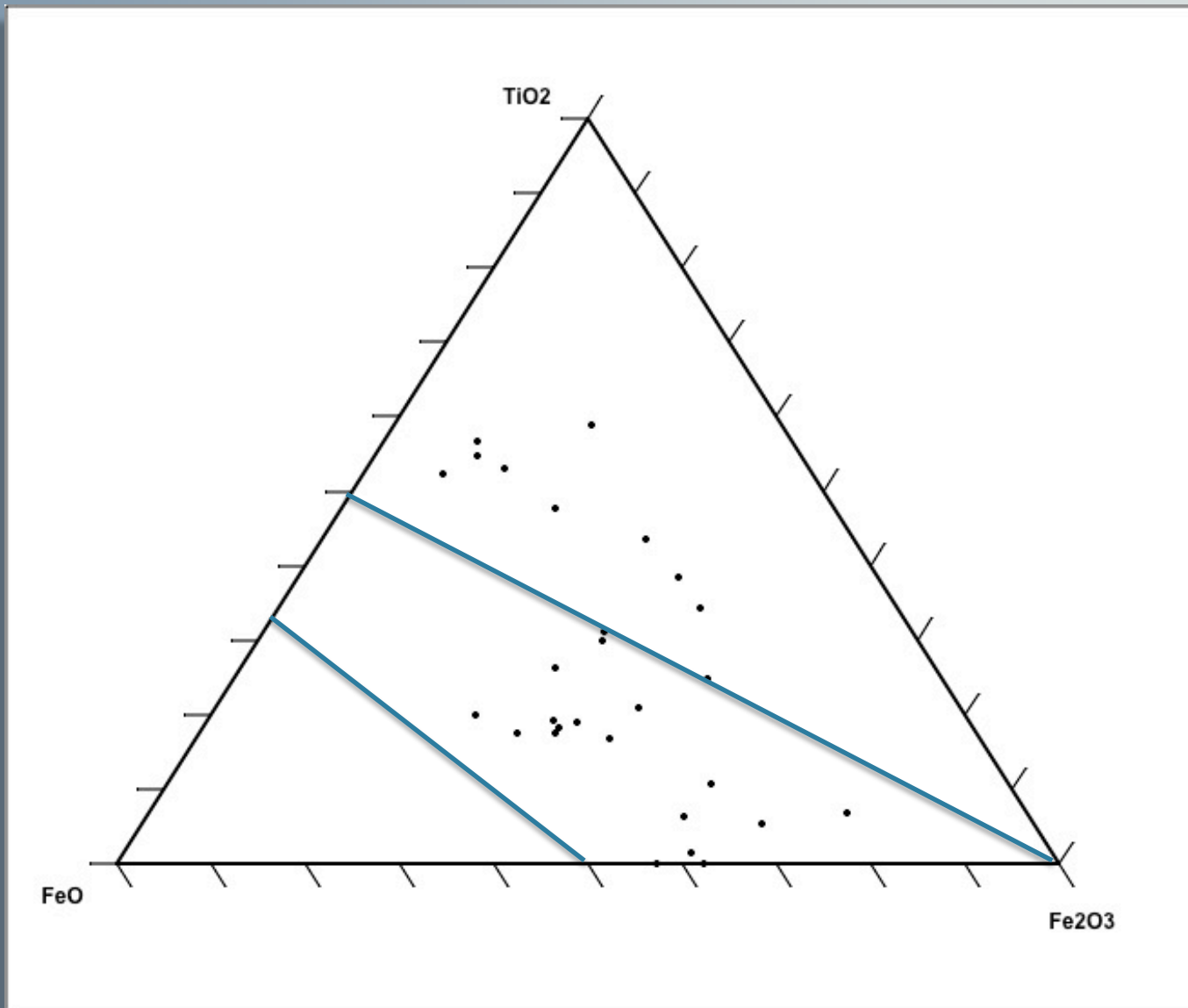
Sample Overview



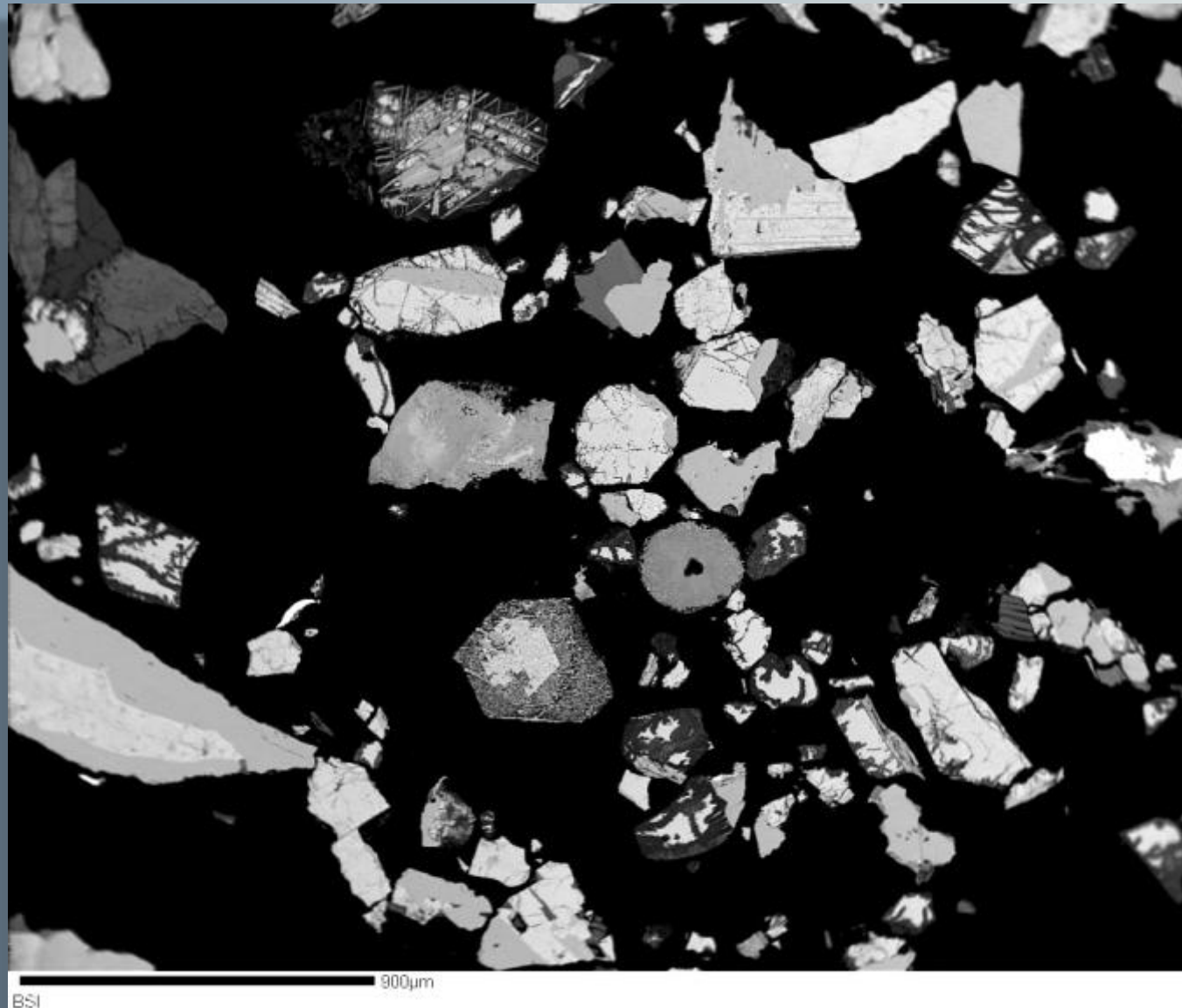
BSI

900µm

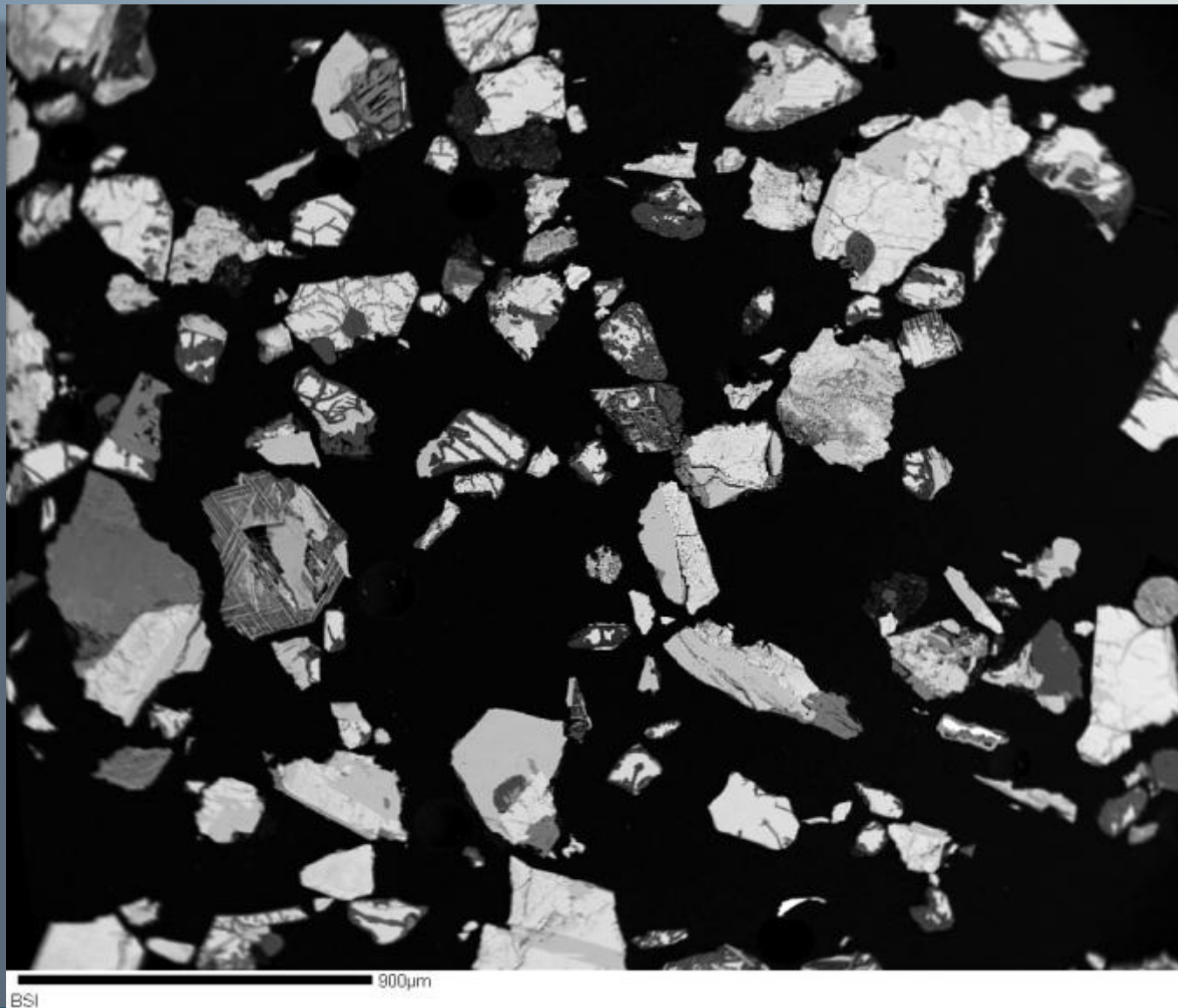
Oxide Chemistry



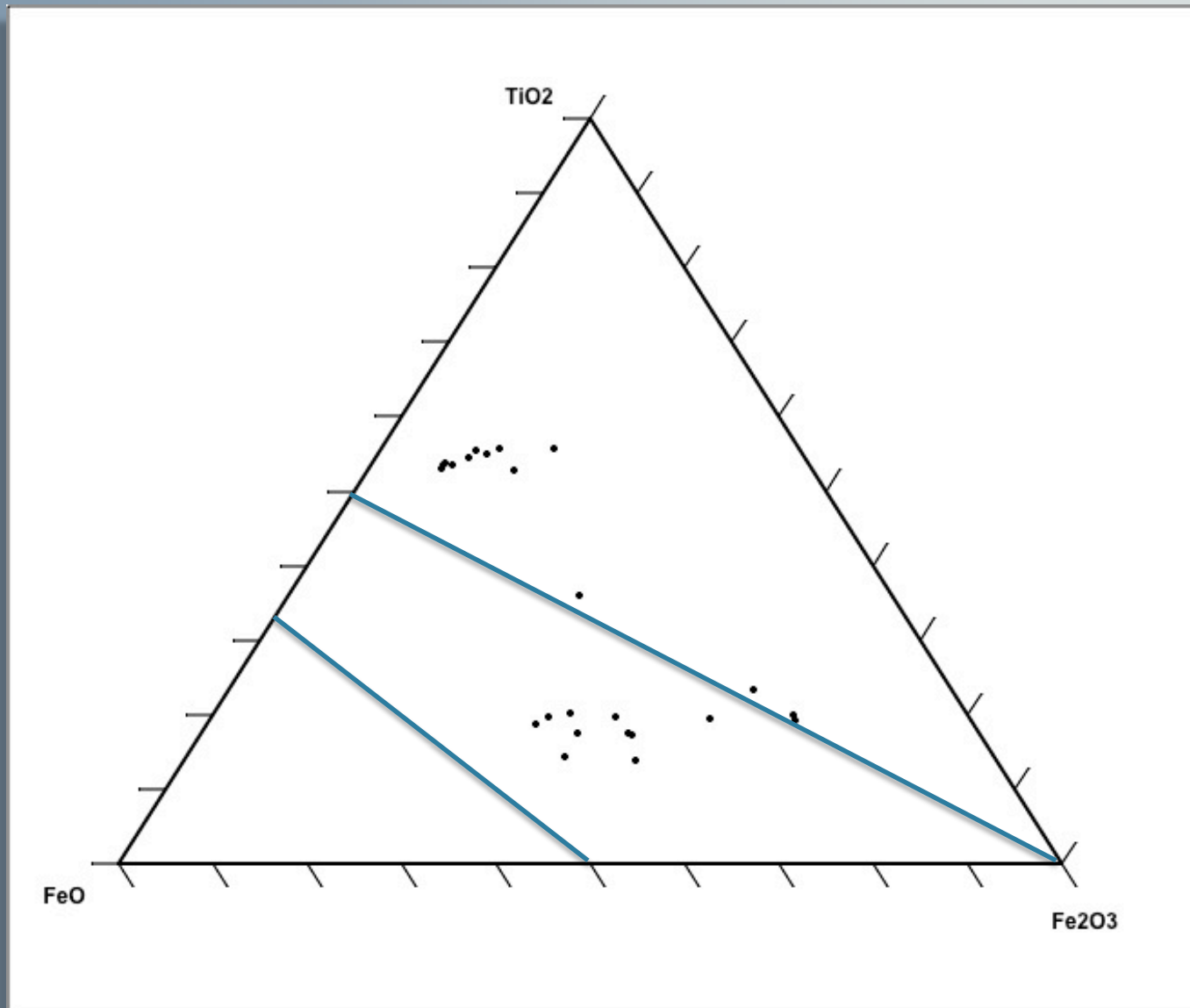
Sample Overview



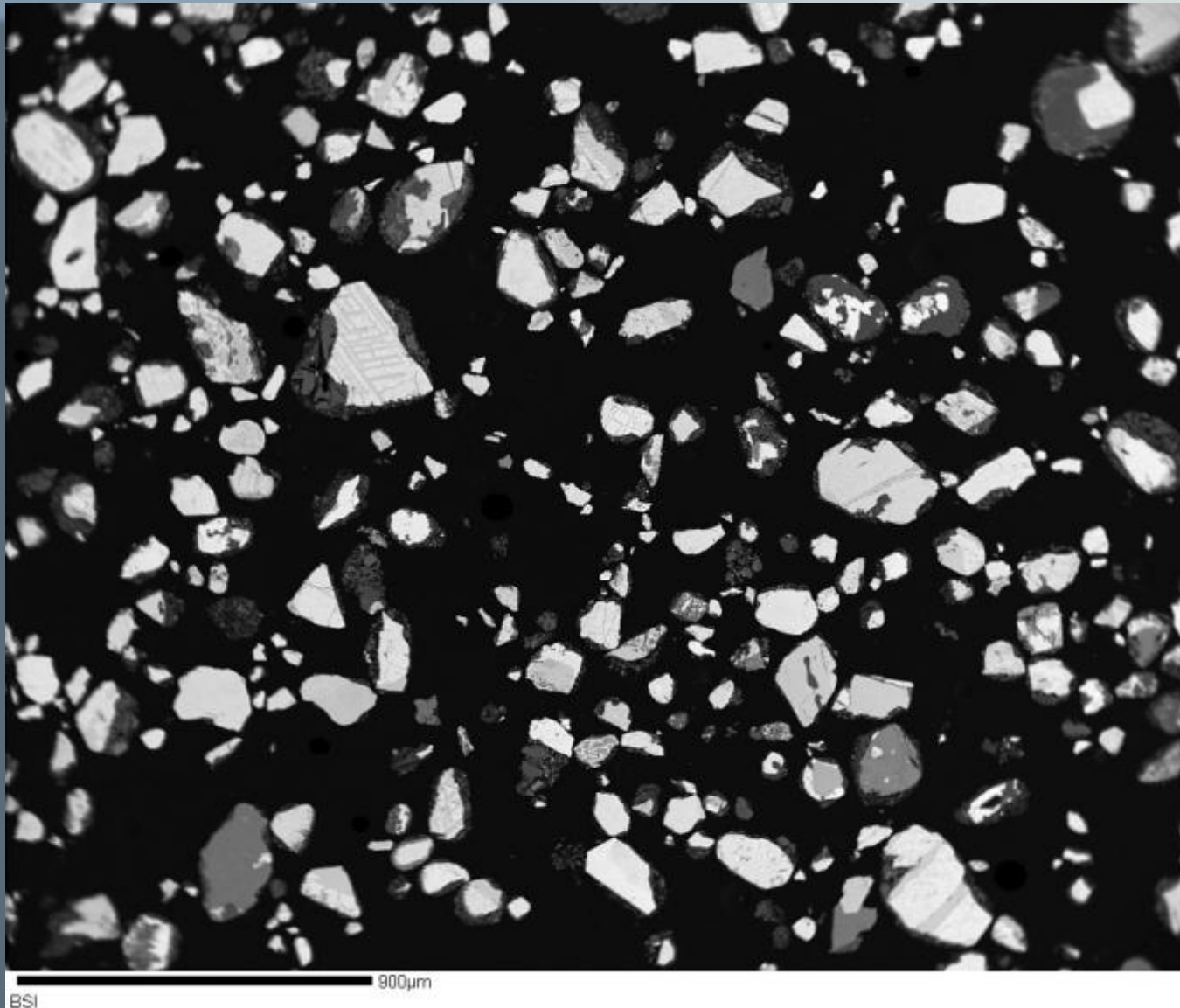
Sample Overview



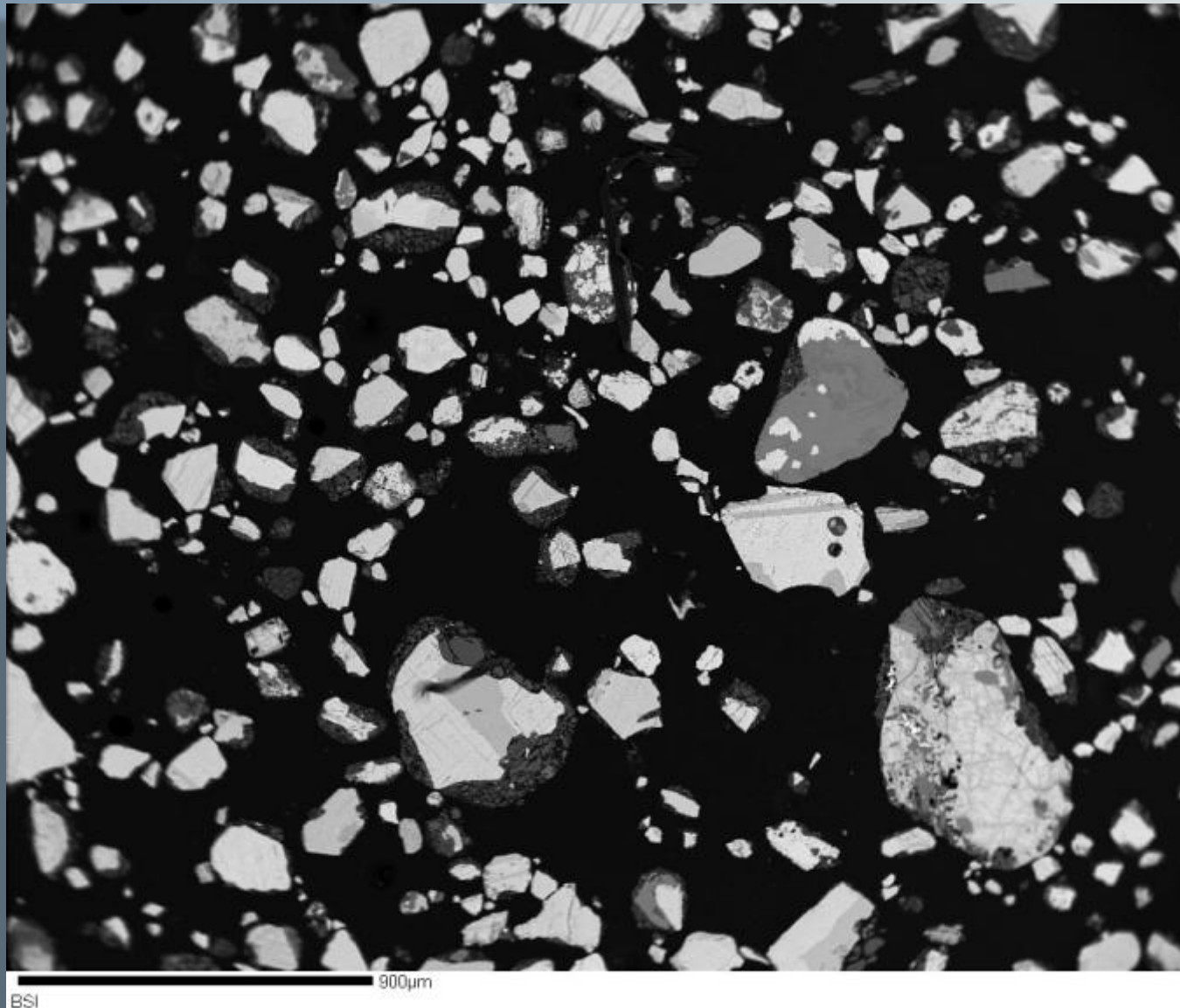
Oxide Chemistry



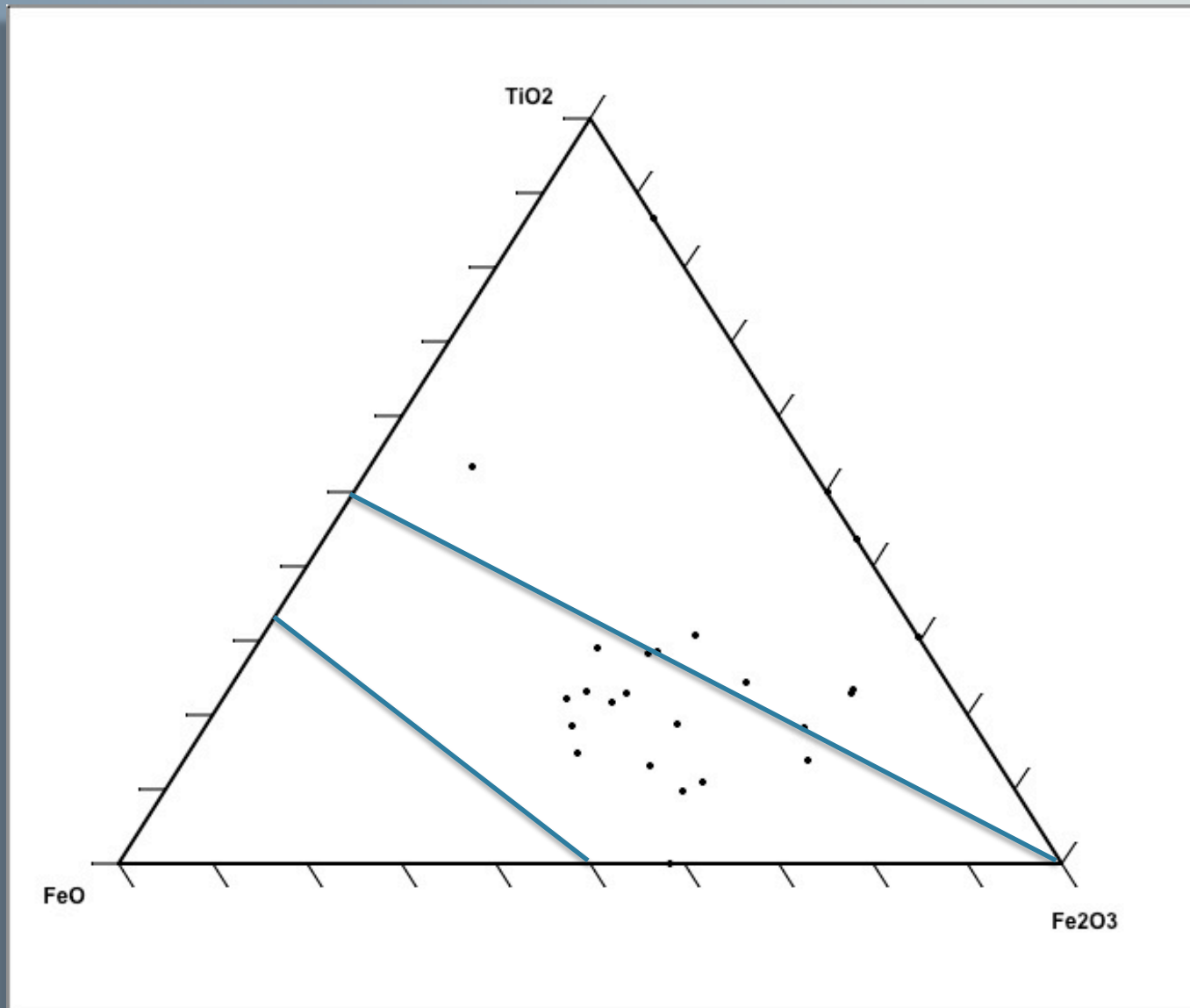
Sample Overview



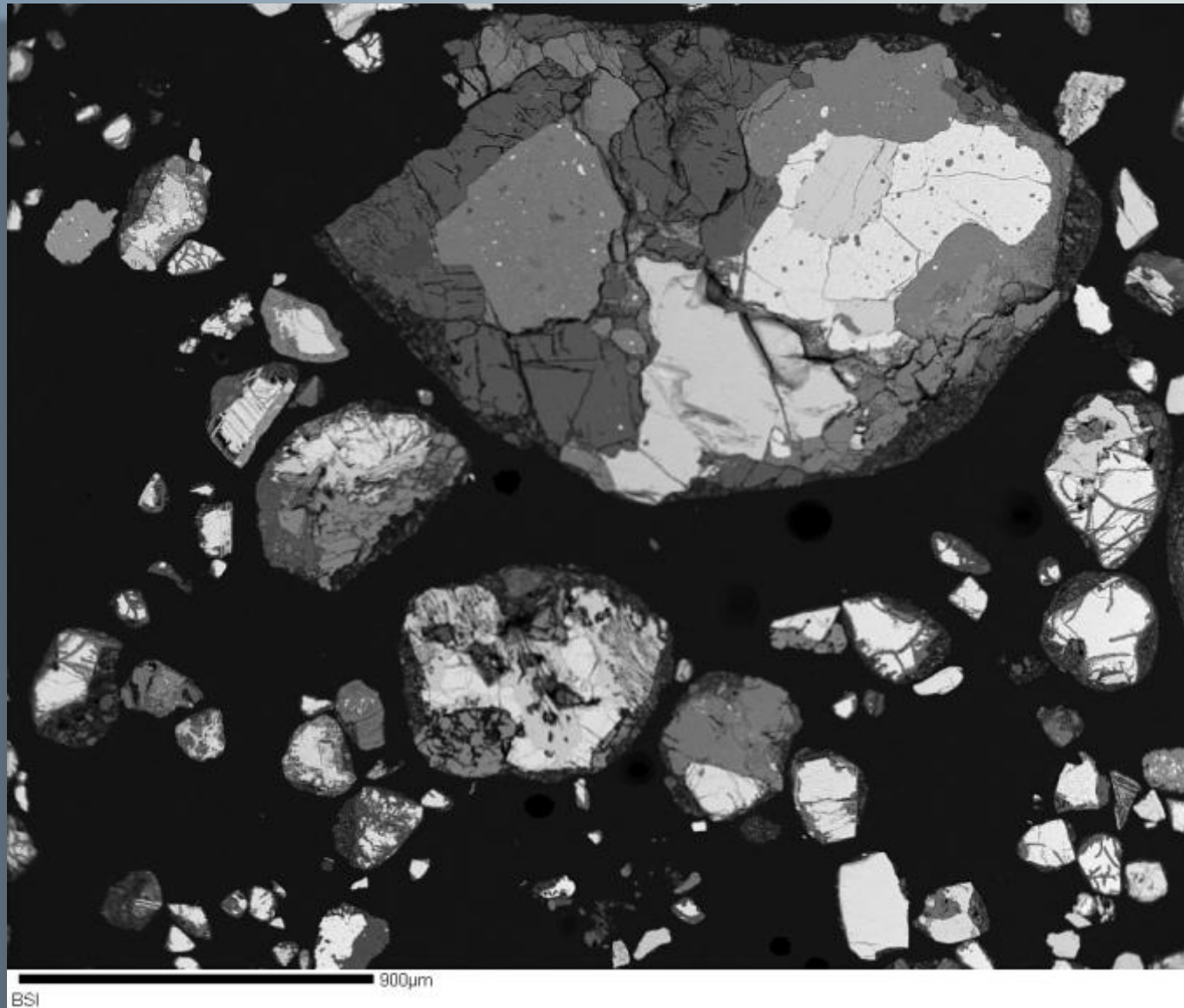
Sample Overview



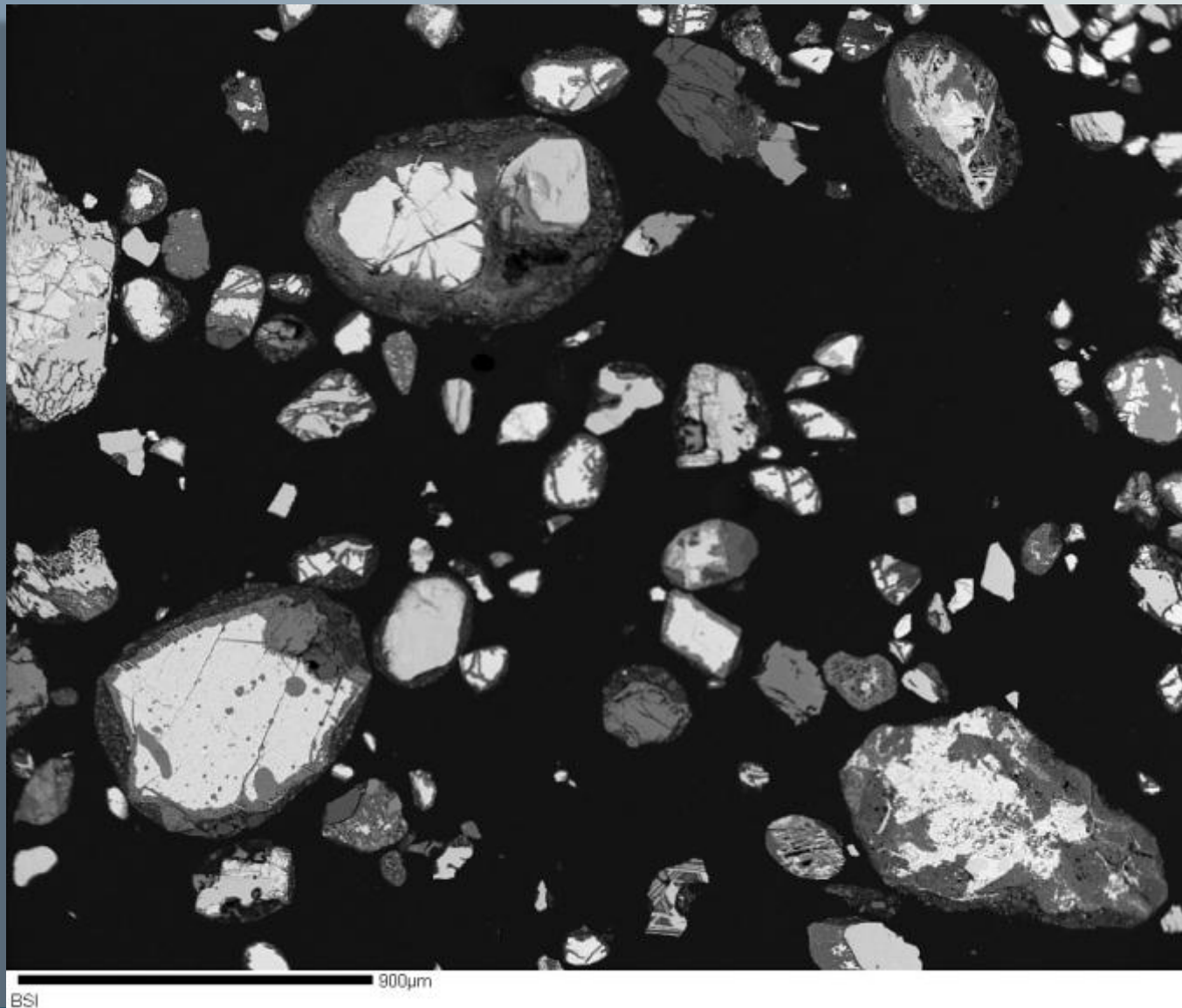
Oxide Chemistry



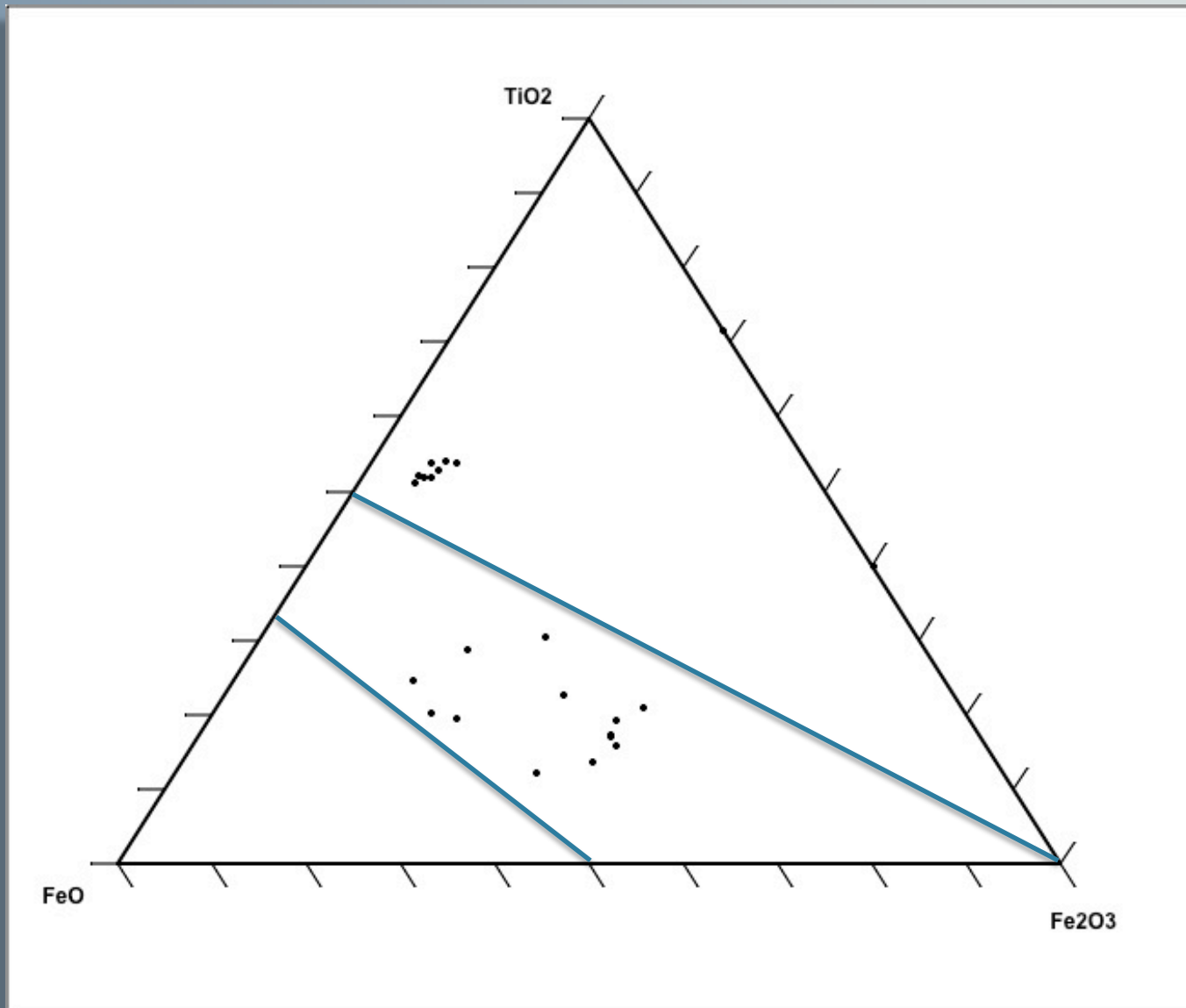
Sample Overview



Sample Overview



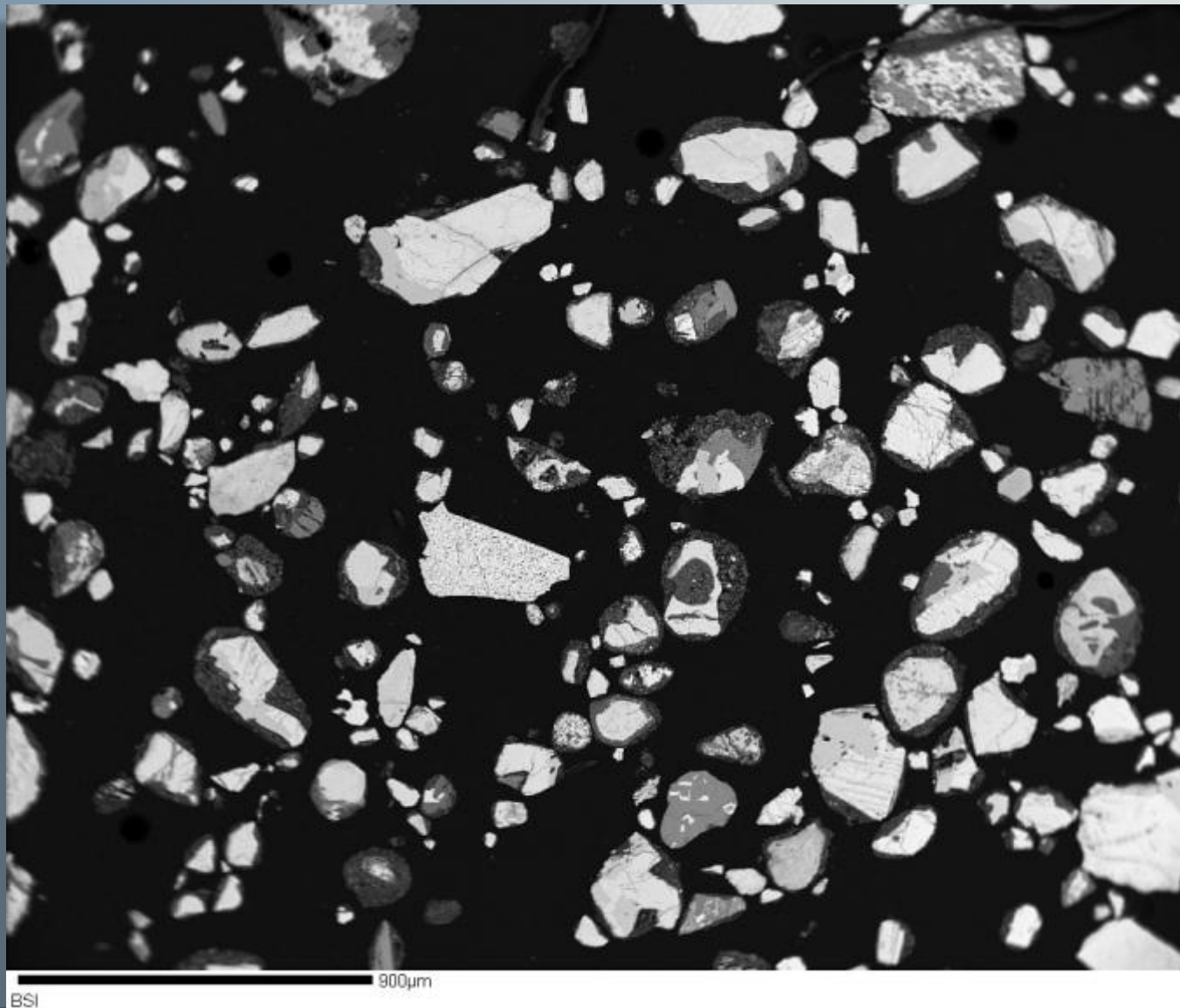
Oxide Chemistry



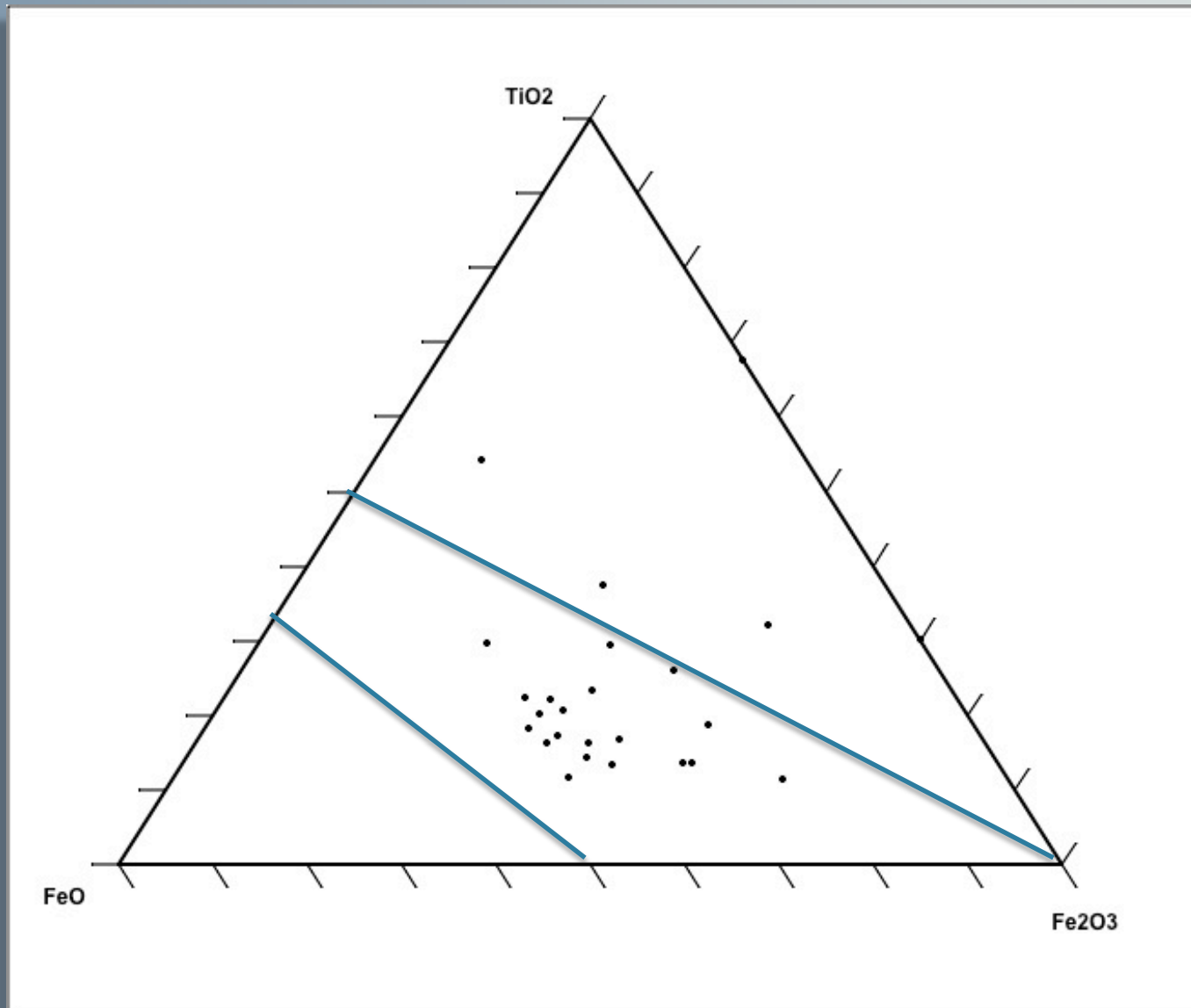
Sample Overview



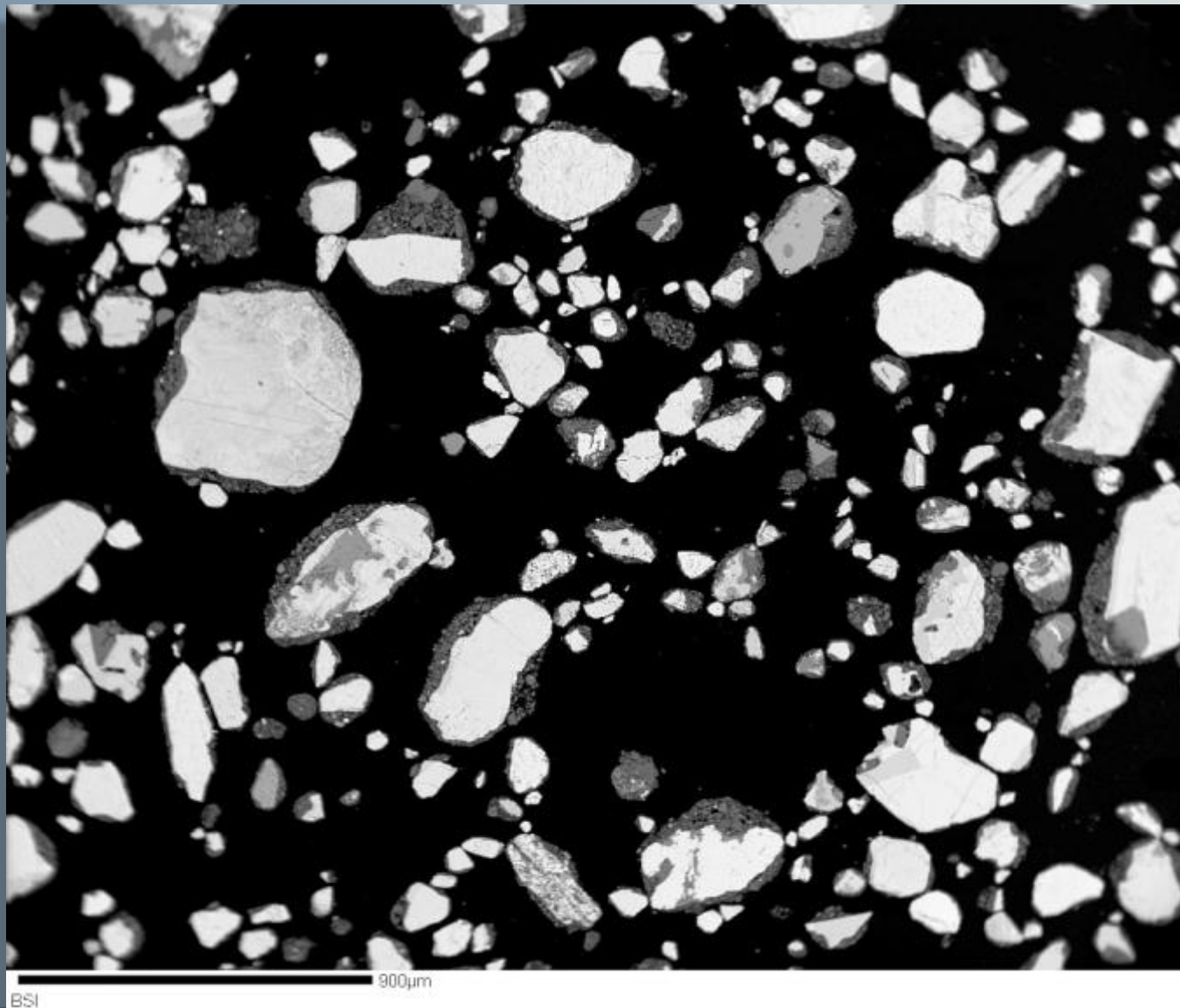
Sample Overview



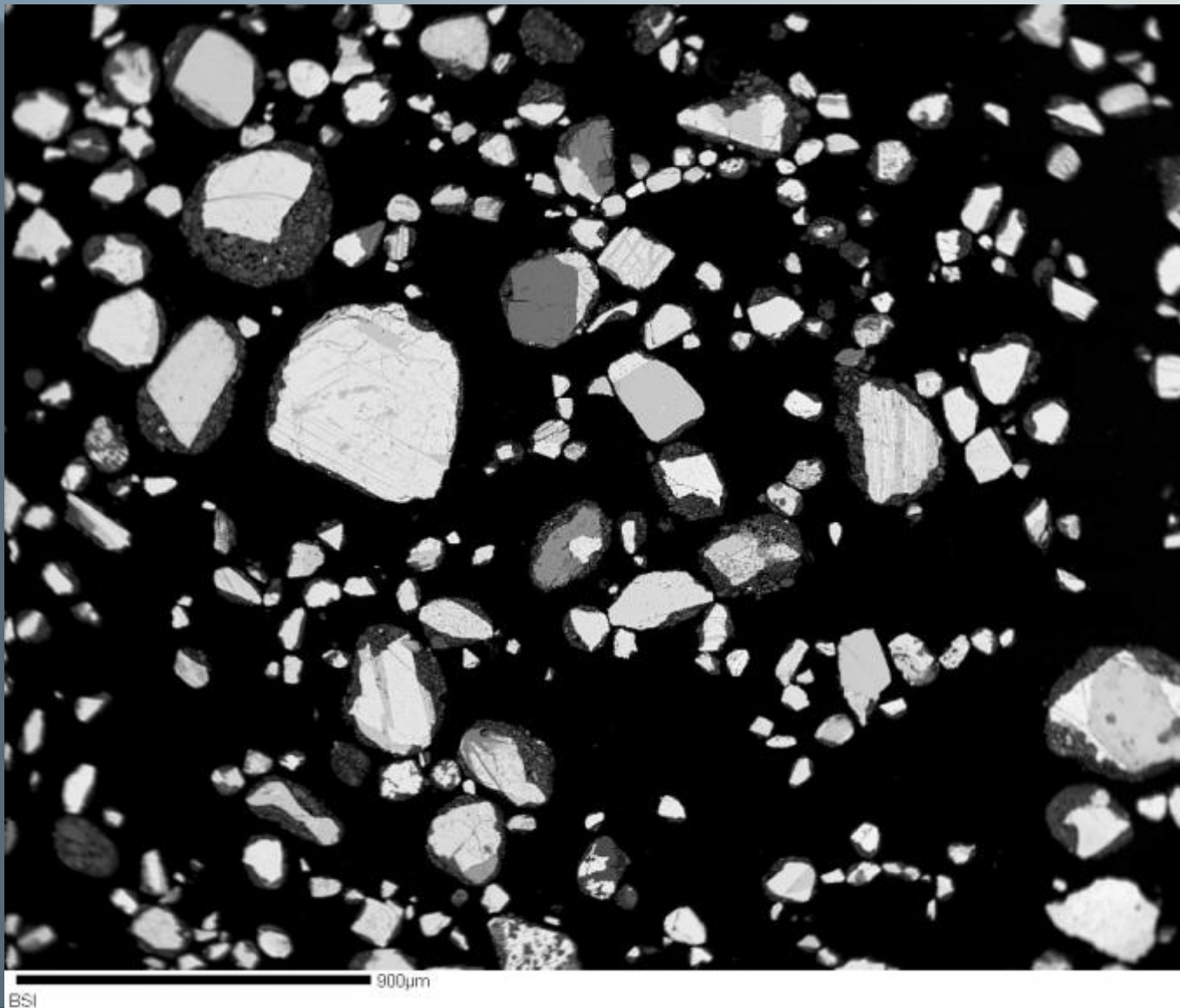
Oxide Chemistry



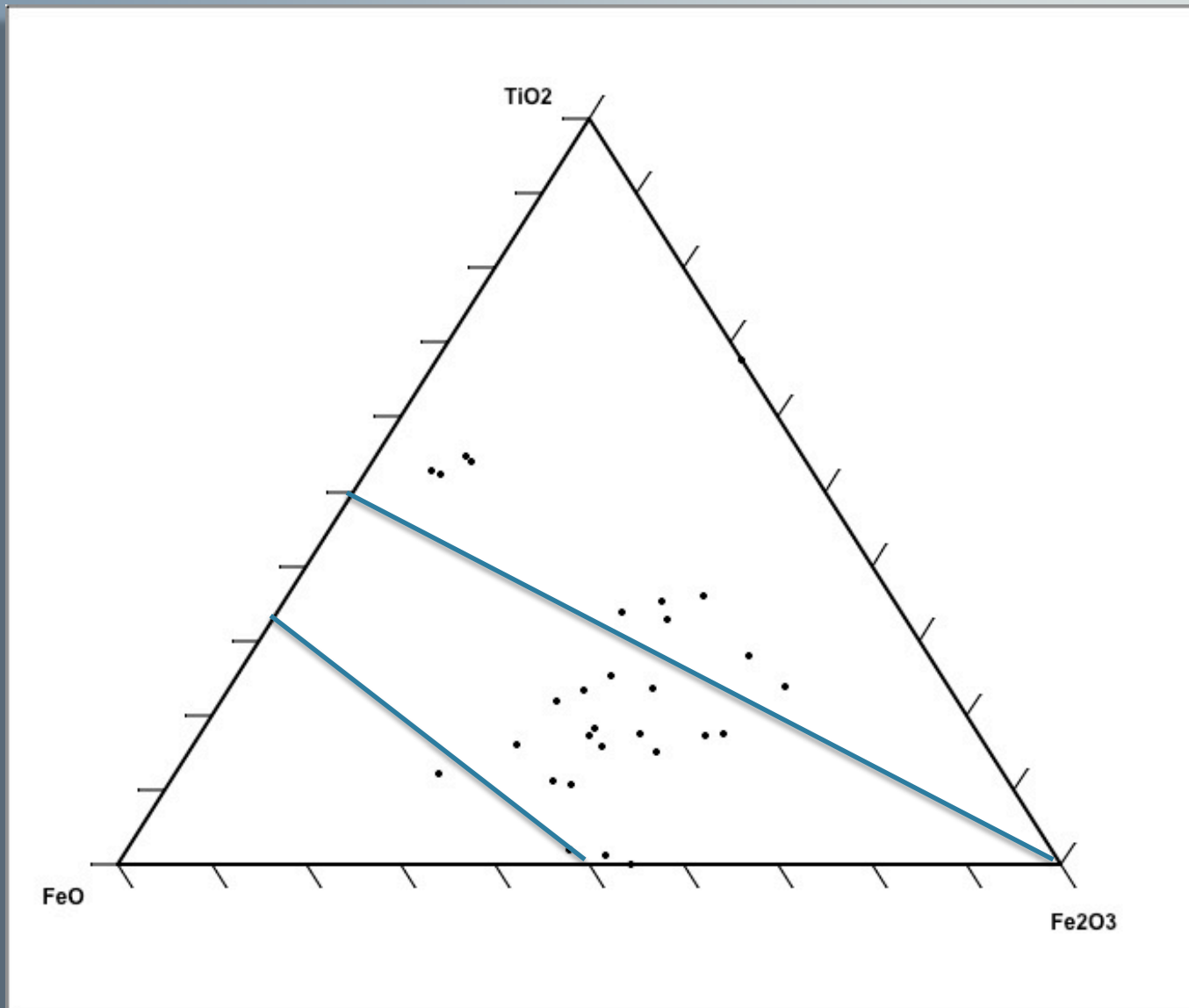
Sample Overview



Sample Overview

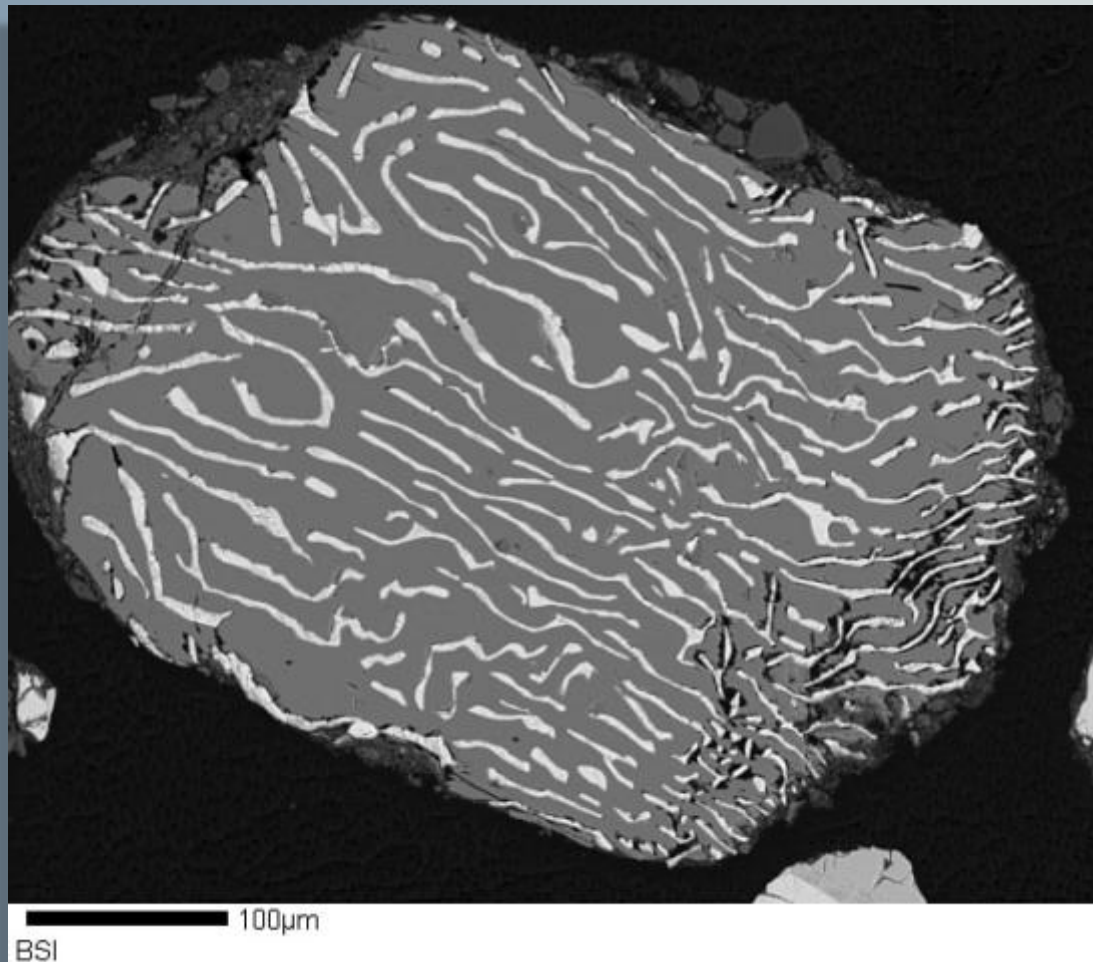


Oxide Chemistry



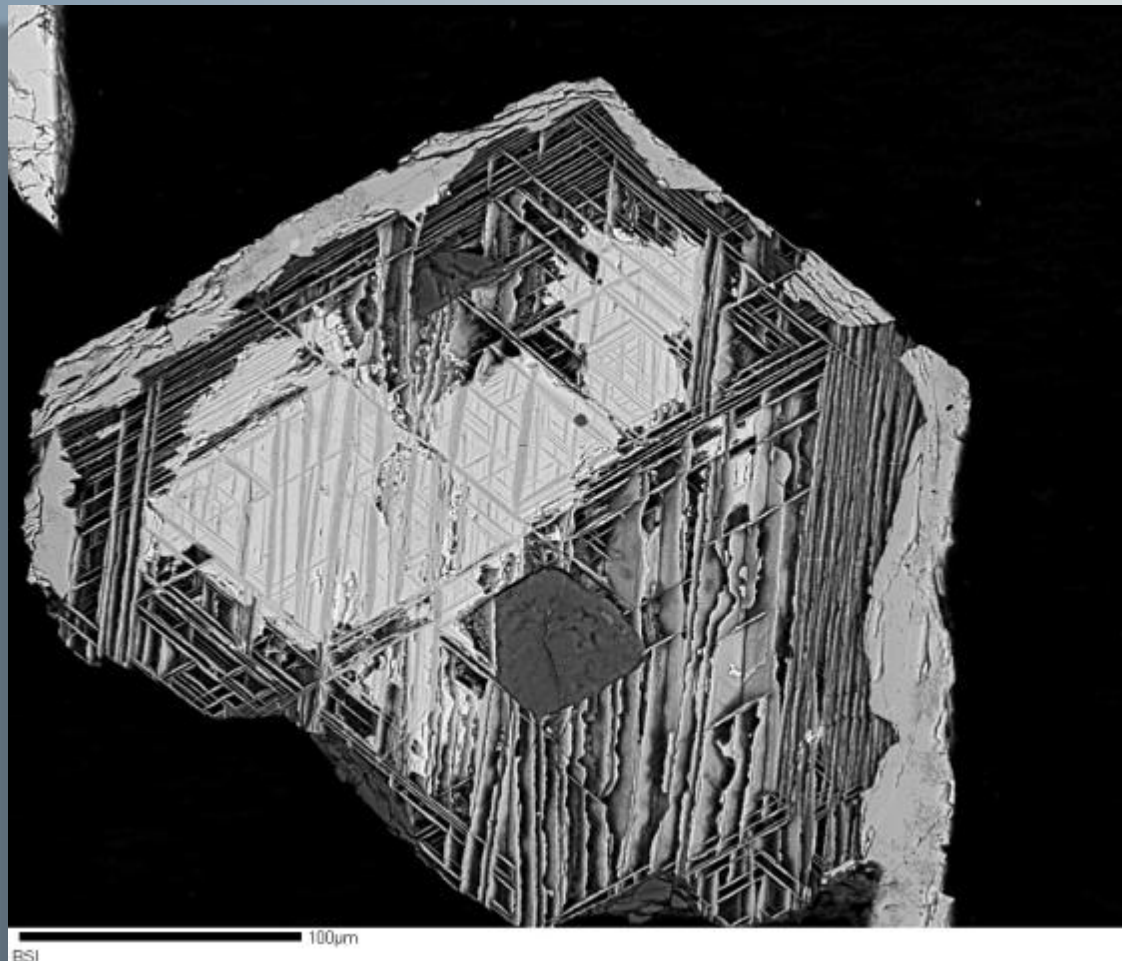
Symplectite: titanomagnetite in olivine

Sample 026



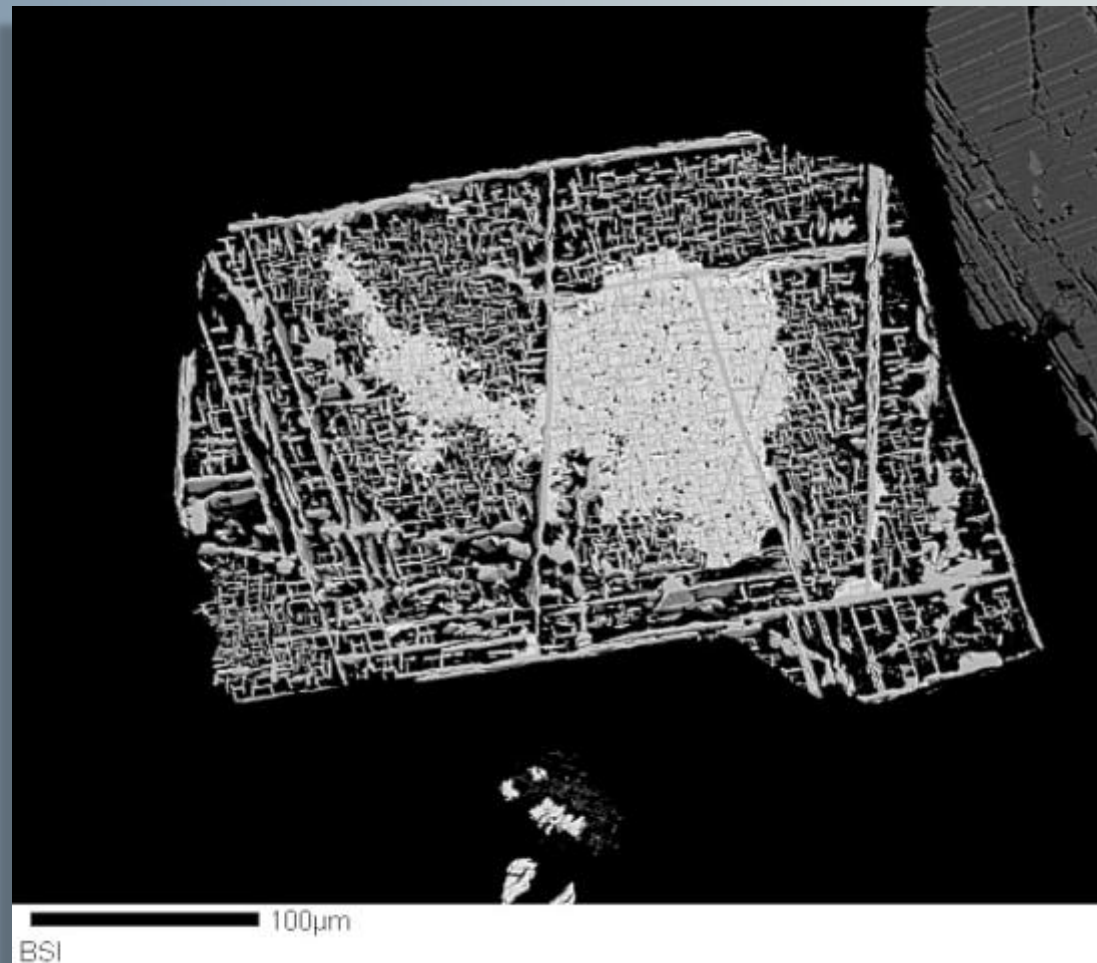
Weathered exsolution magnetite/ilmenite

Sample 066



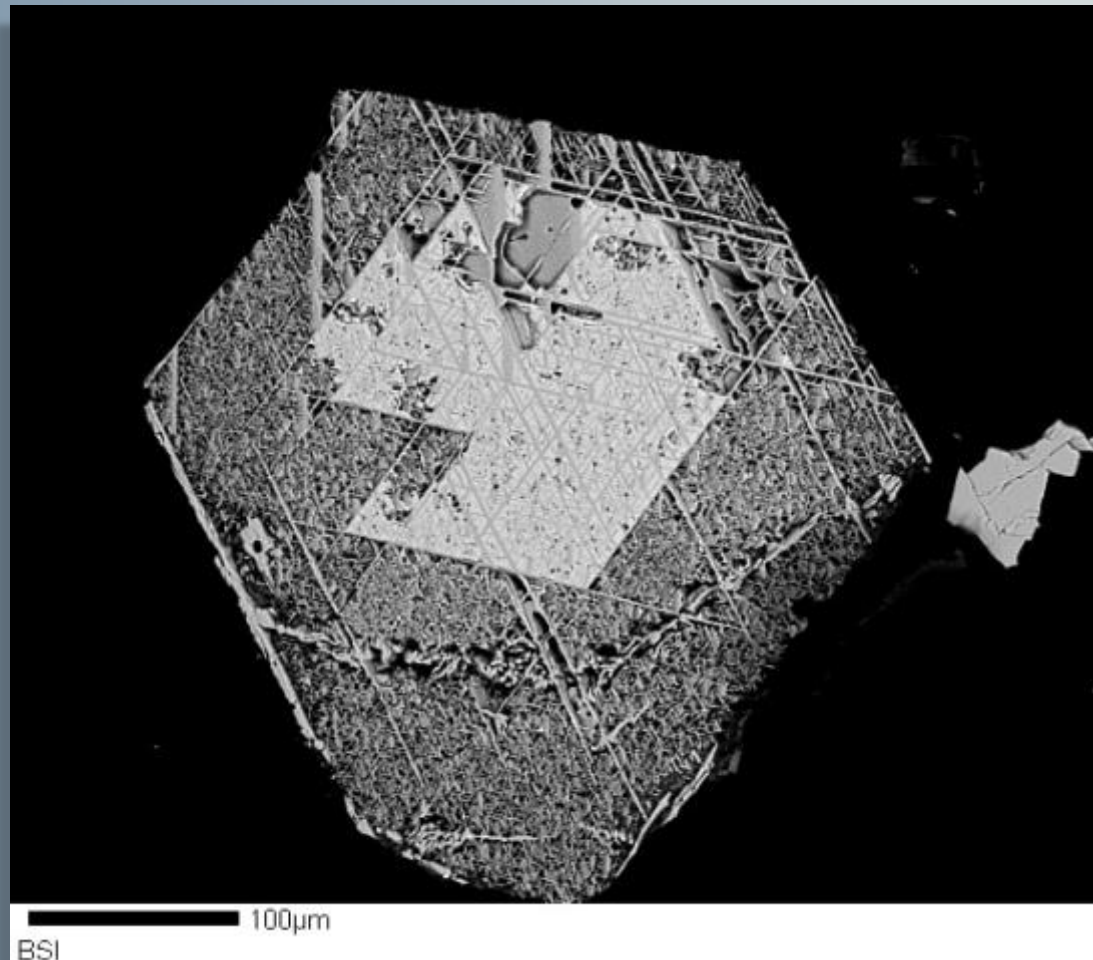
Weathered exsolution magnetite/ilmenite

Sample 066



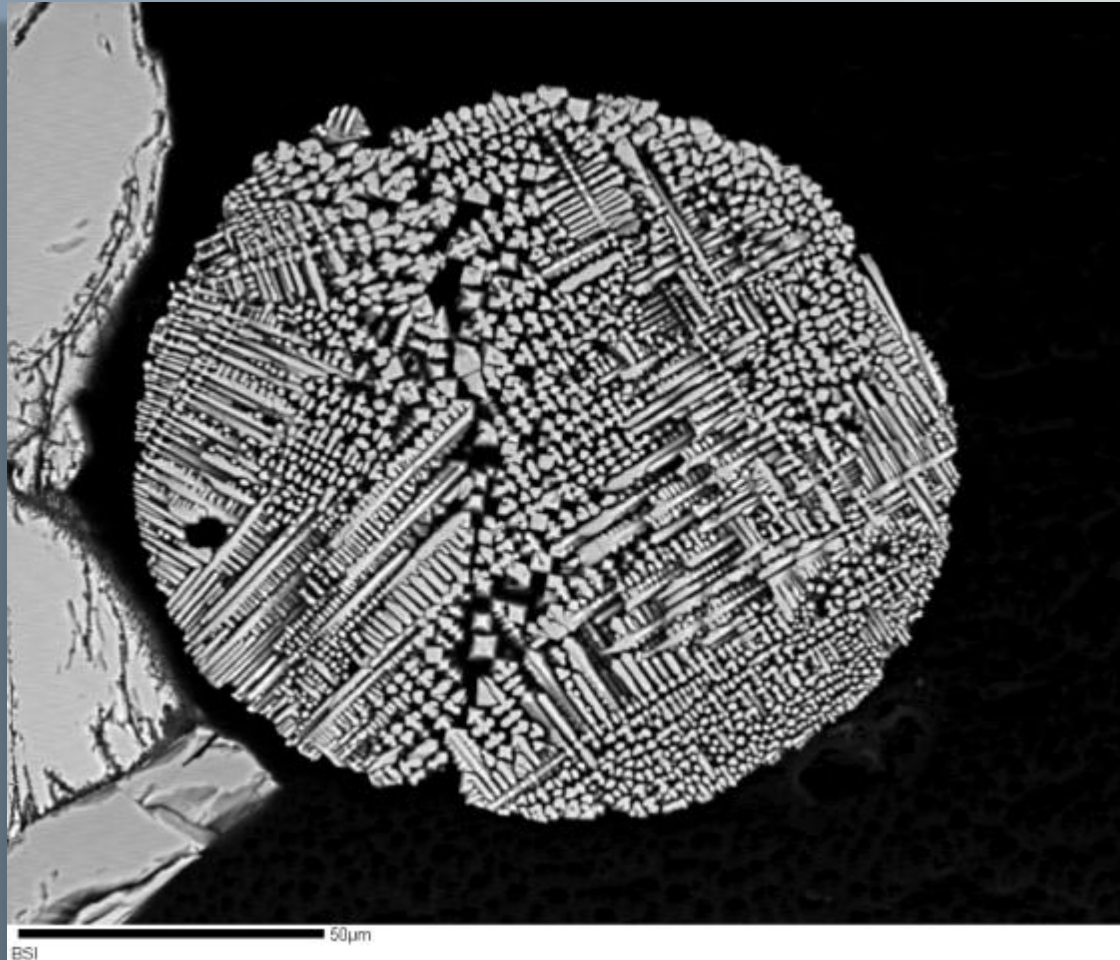
Weathered exsolution magnetite/ilmenite

Sample 066



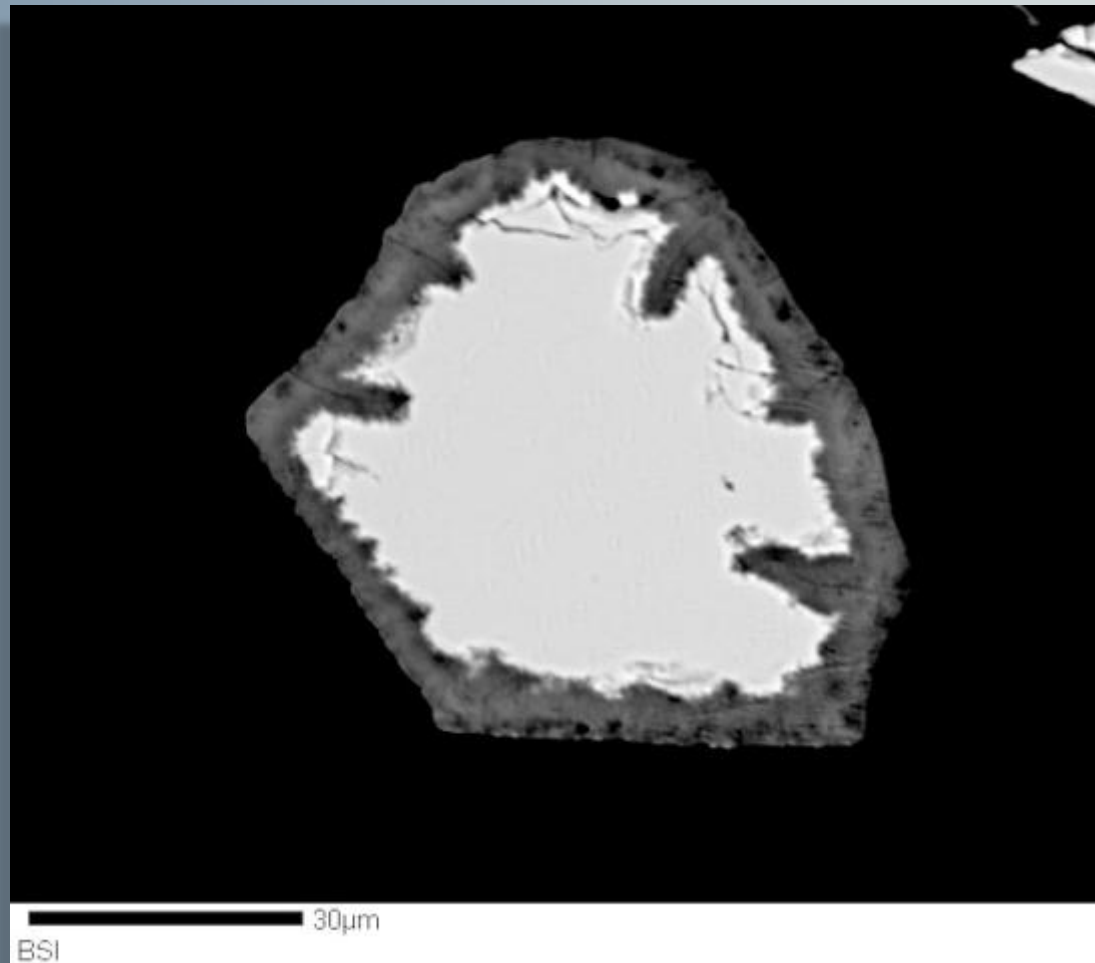
Fe oxide ovoid

Sample 066



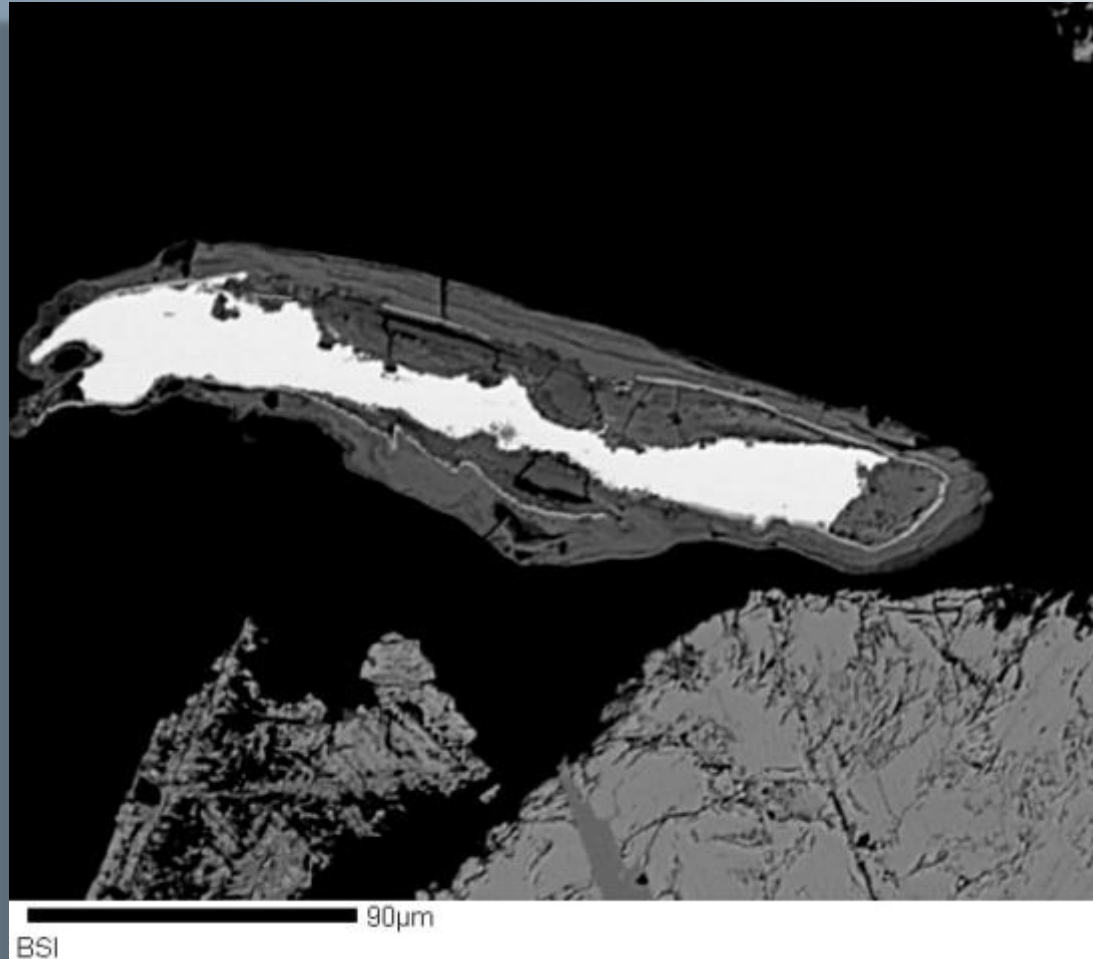
Rutile rim on titanomagnetite

Sample 066



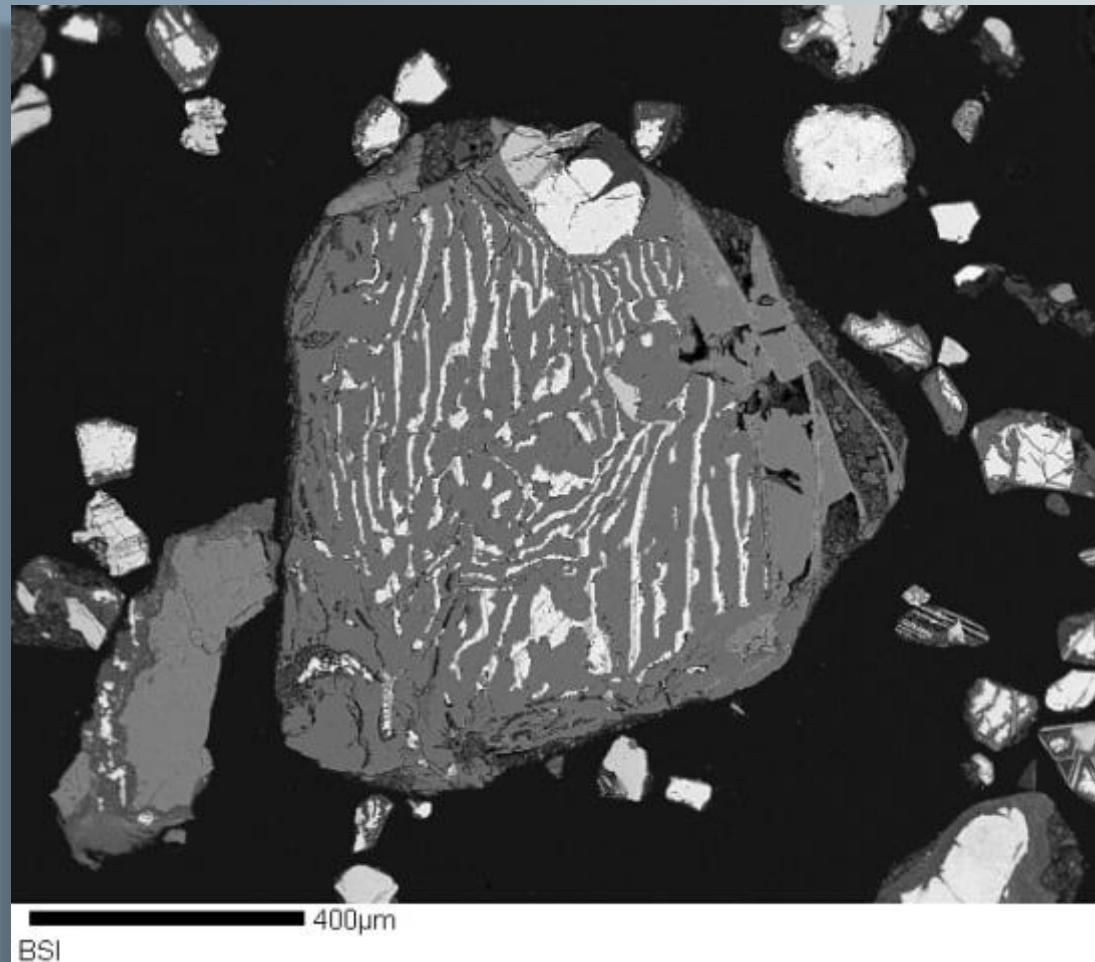
Weathering: Fe oxide-hydroxide surrounding magnetite

Sample 066



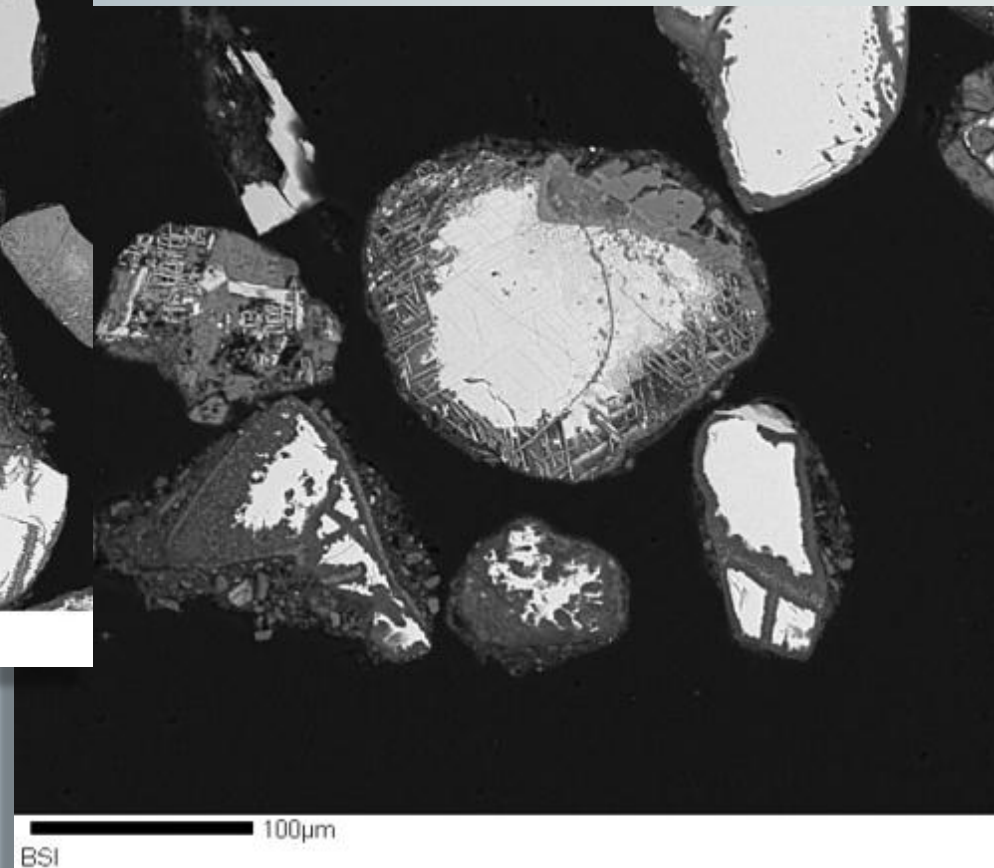
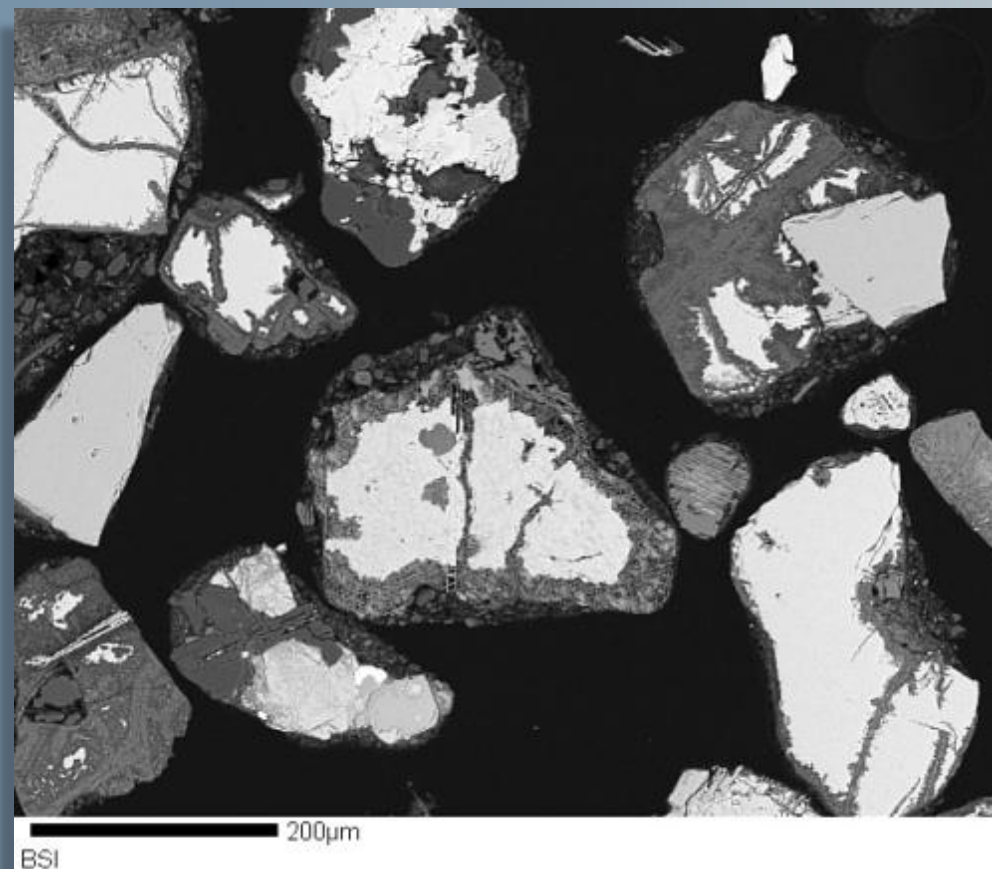
Symplectite: titanomagnetite in olivine

Sample 092



Weathering rinds

Sample 092



Backscattered electron imaging of the samples showed that the grains were extremely complicated with both intergrown minerals and later weathering. It was determined that rim versus core analyses would not provide any useful information.

No primary mineral zoning was observed in the backscattered electron images.

Each sample was extensively search for PGM grains. None were found.