

# **Pilot Sample NU-LHT-1M**

## **SEM/EDS reconnaissance**

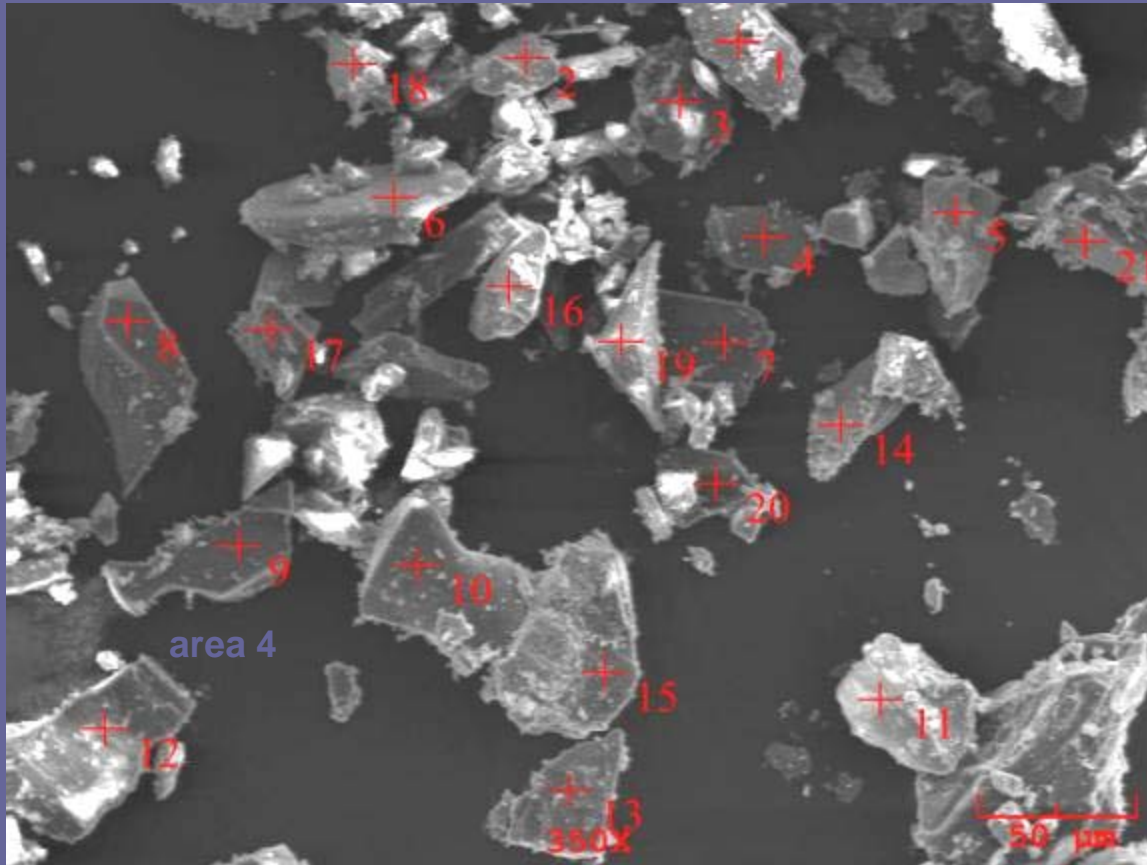
**Sue Wentworth**

**ESC Group, JSC/ARES**

**grain count spectra collected  
by John Lindsay**

# Preliminary SEM/EDS grain counts by John Lindsay

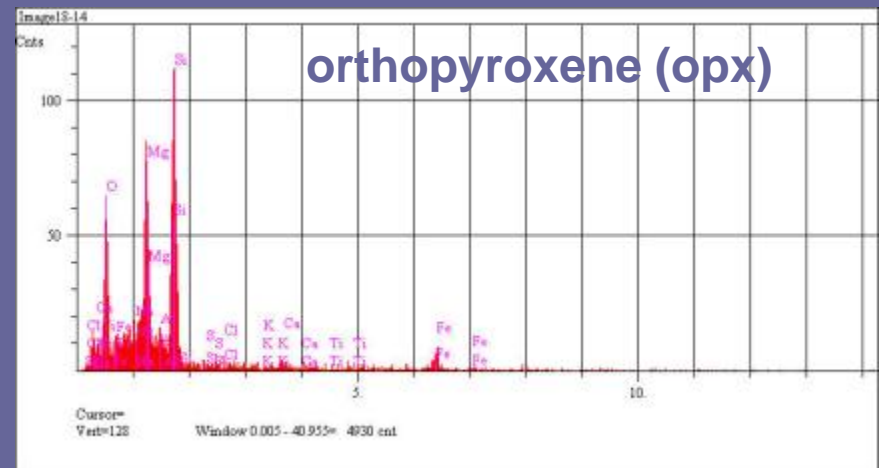
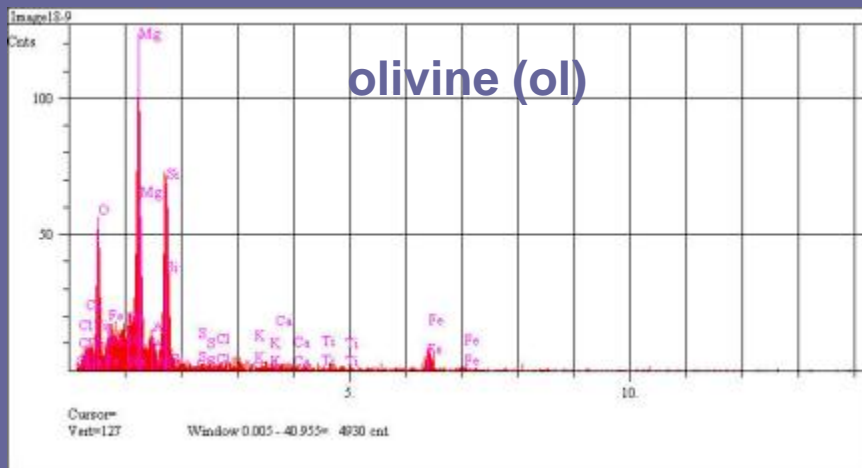
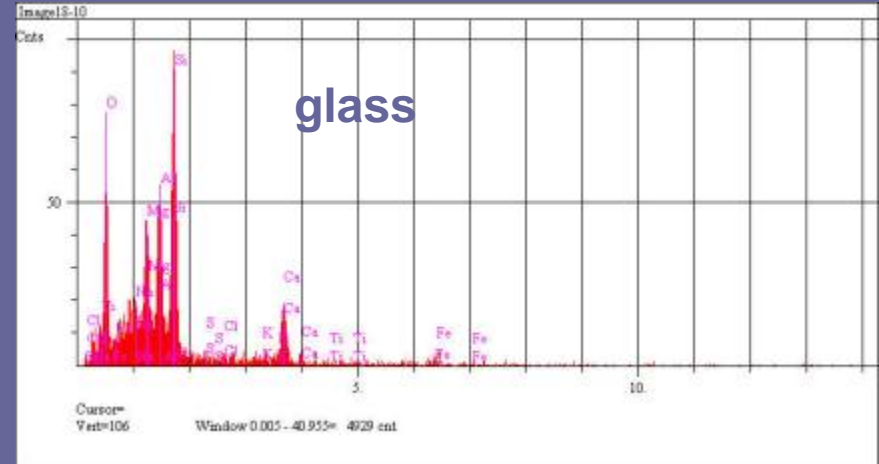
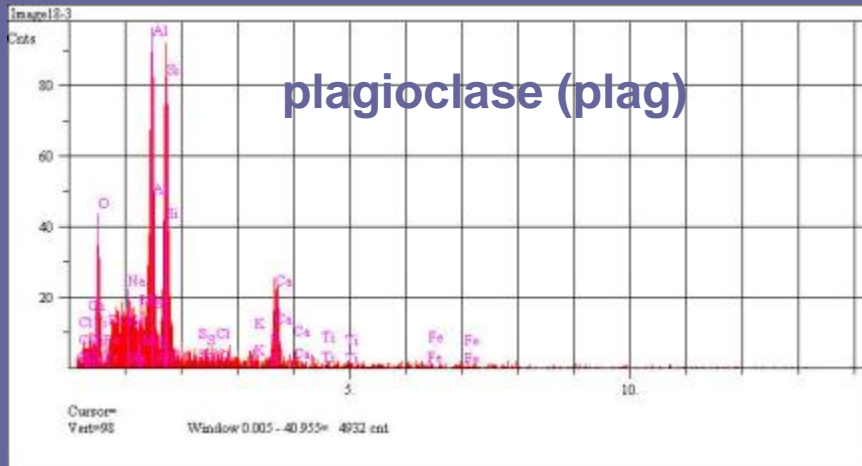
Analyses were made using JEOL 5910LV SEM equipped with an IXRF EDS system.



Initial SEM and EDS done by John Lindsay included preliminary random grain counts in four areas. Area 4 is shown at left. Results of EDS survey (75 grains total) are below. Olivine and opx totals seem high based on further SEM work.

grain abundances	
plagioclase	41.3
glass	38.7
olivine	12.0
orthopyroxene	6.7
clinopyroxene	tr
Fe oxide	1.3

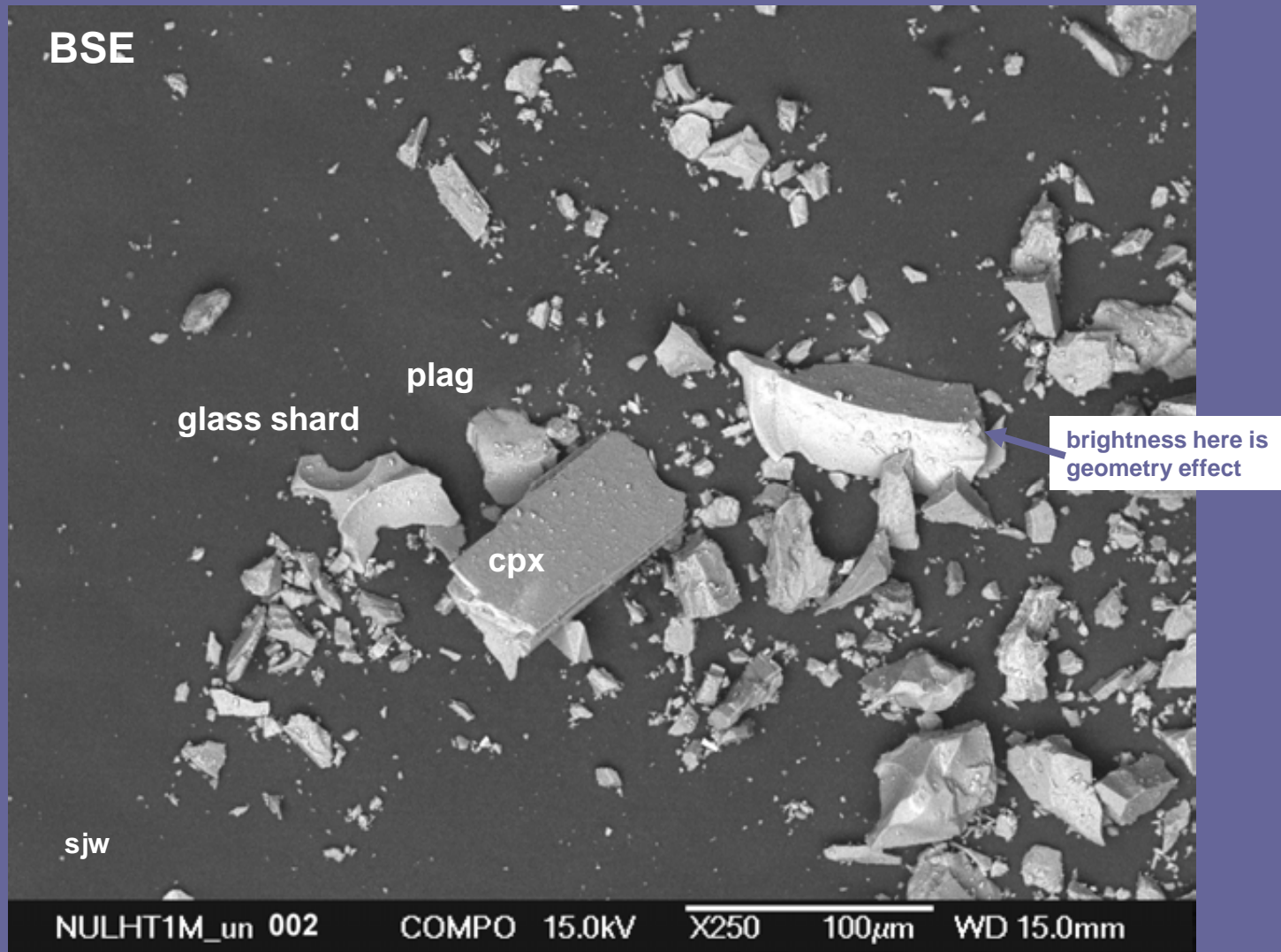
Typical spectra for phases in grain count (above);  
Fe oxide not shown.

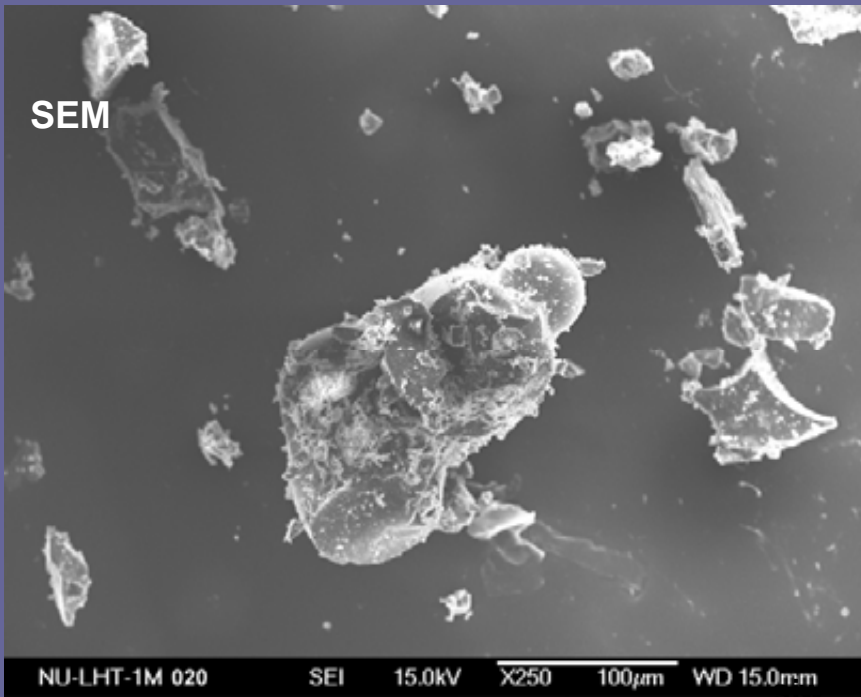


# SEM/EDS on this and following pages: JEOL 6340F FE-SEM, by Sue Wentworth

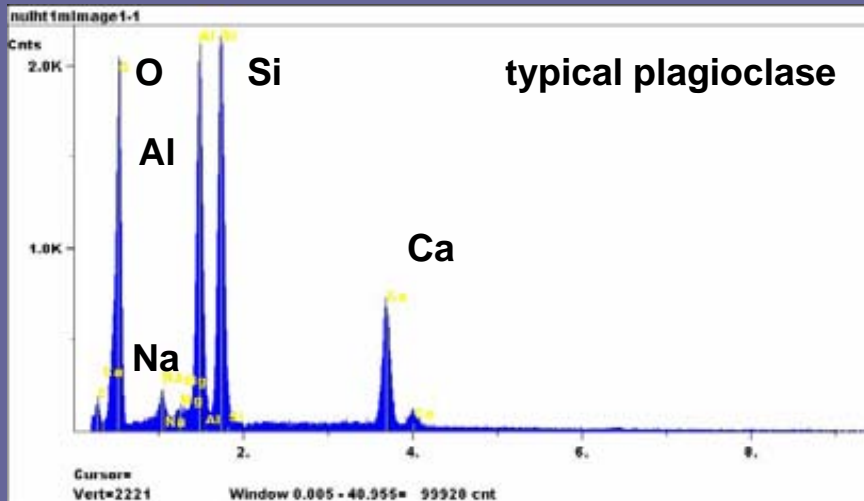
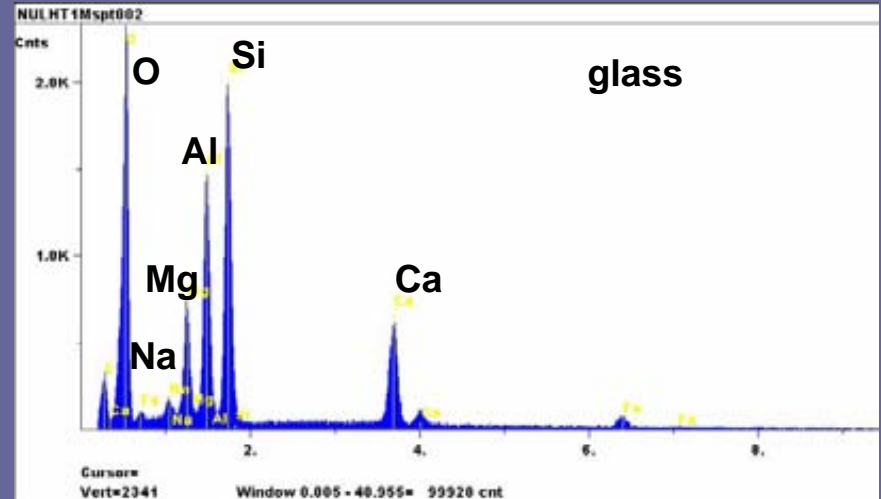
Backscattered electron (BSE) image of typical area:

Most common phases in sample are plagioclase and glass. Olivine and orthopyrxene are also present (previous page). Other phases include rare clinopyroxene (cpx, below) and ilmenite.





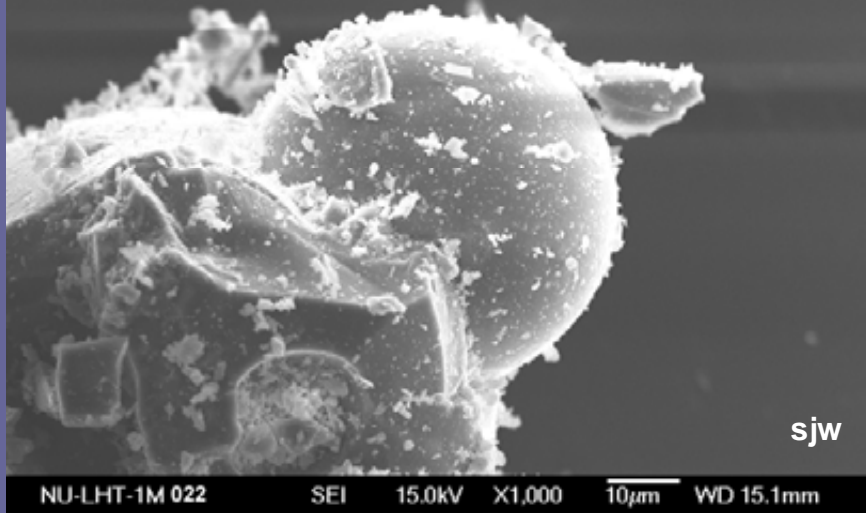
Glass spherules are rare to isolated. This one is firmly attached to larger vesicular glass. Glass has Mg-rich highlands composition regardless of shape, and is homogeneous. No inclusions have been identified in glass. Nothing found in sample that looks like agglutinate. Found isolated ilmenite(?), a Zr-rich grain, and a grain consisting of Si, Al, C, and O.



Glass constituents (in order of decreasing peak height, which qualitatively correlates to abundance ): O, Si, Al, Mg, Ca, Na, Fe.

Composition is excellent approximation to those of many lunar highland impact glasses .

SEM: closer view of grain shown previously



SEM closeup of spherule, left.



**Grain sizes:**

Full range of grain sizes is present.

Small grains adhere to each other.

Large grains have adhering tiny grains.

Tiny grains seem to have same compositions as larger ones.

**Sample comments:**

Sample in jar is distinctly speckled black and white, unlike lunar soil, which would be dark gray.

Sample does not behave like lunar soil during preparation; i.e., it does not adhere to scoop.