Identifying Signatures for WTC Contamination

The desirability of a method is driven by the following factors:

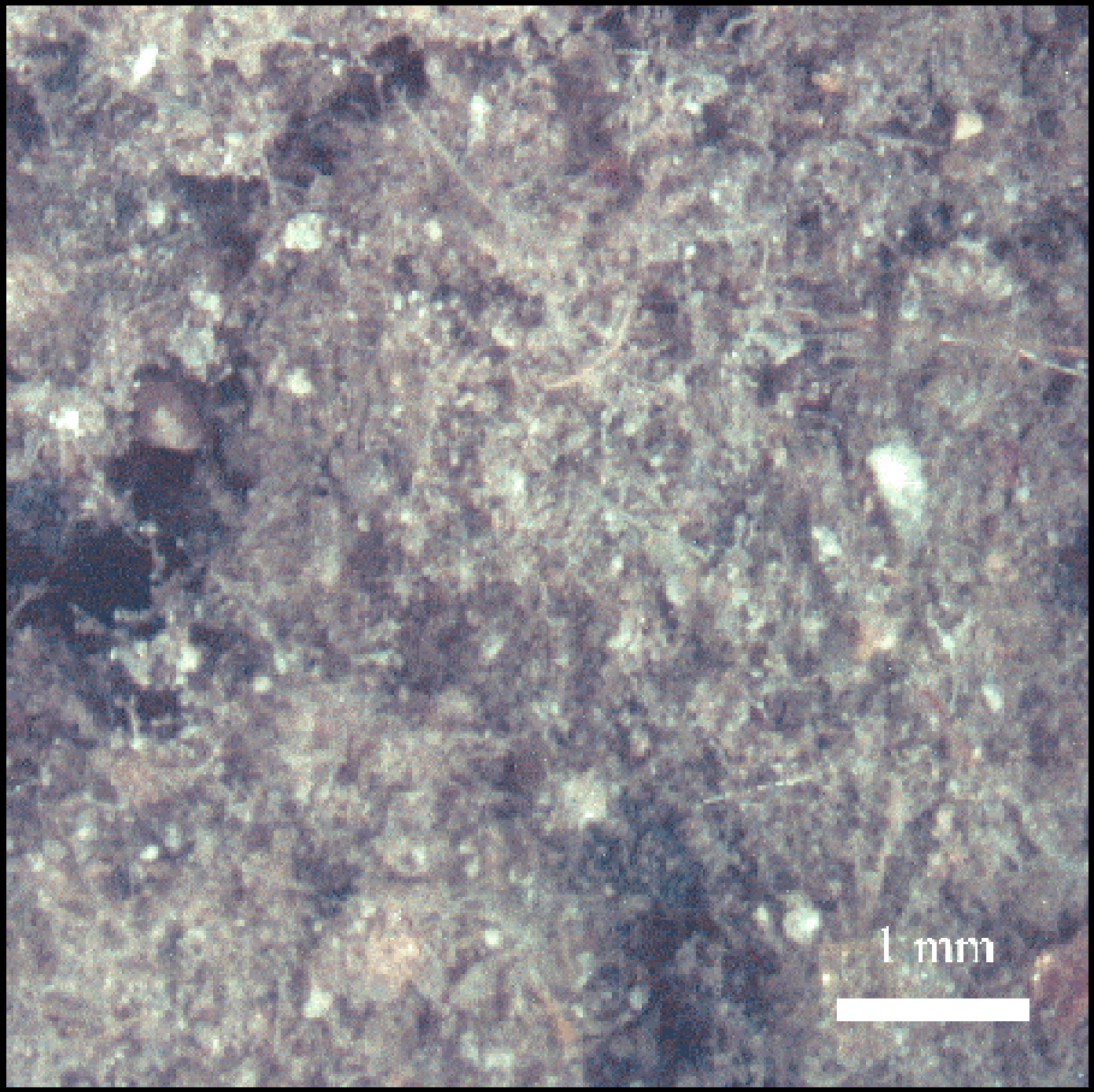
The Panel, in response to public input, feels that testing for contamination in addition to re-contamination of previously cleaned units is the proper course.

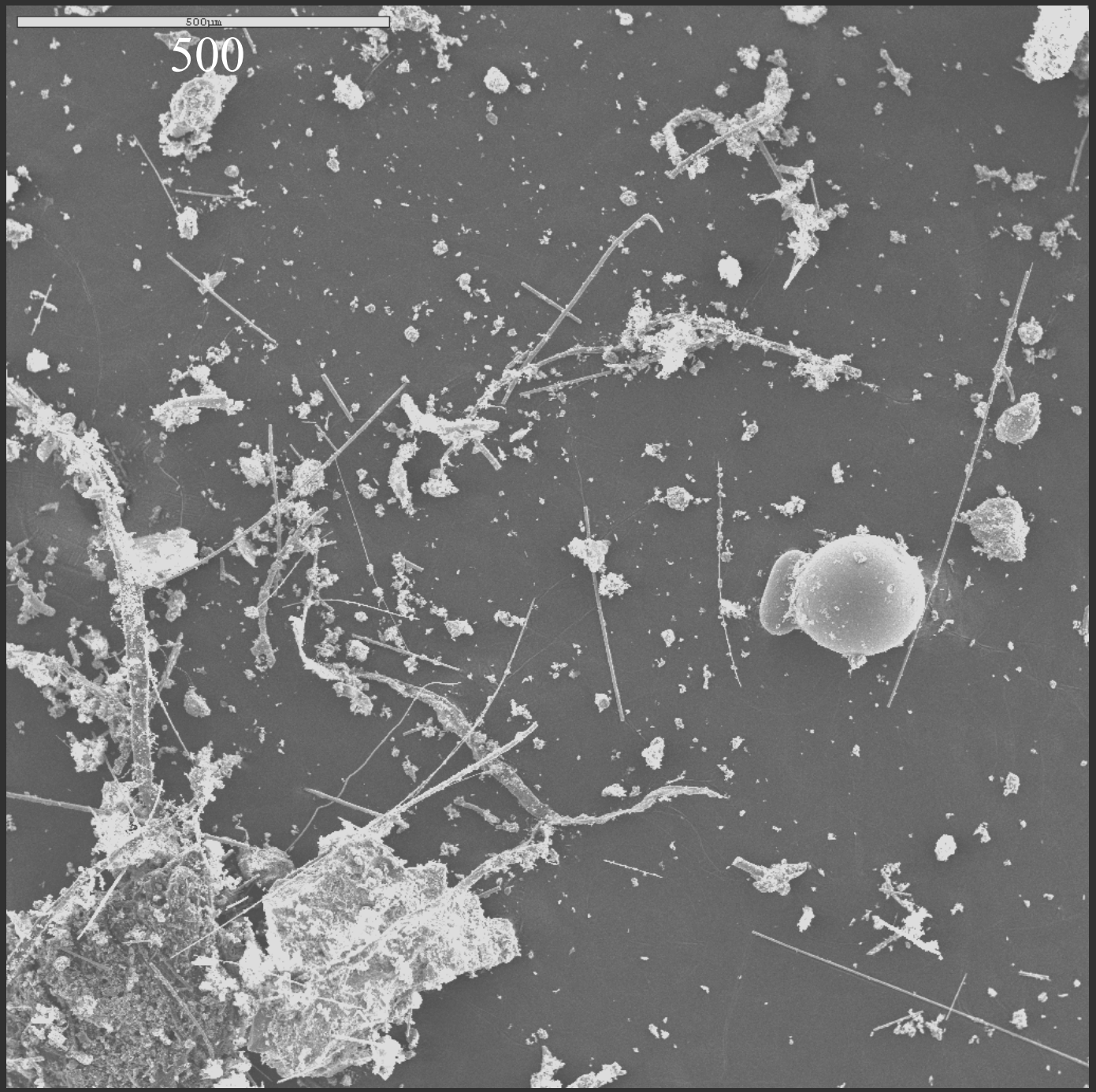
Testing should be conducted in a comprehensive program to include a full range of sampling units and/or structures to be later defined (sub-group on sampling units)

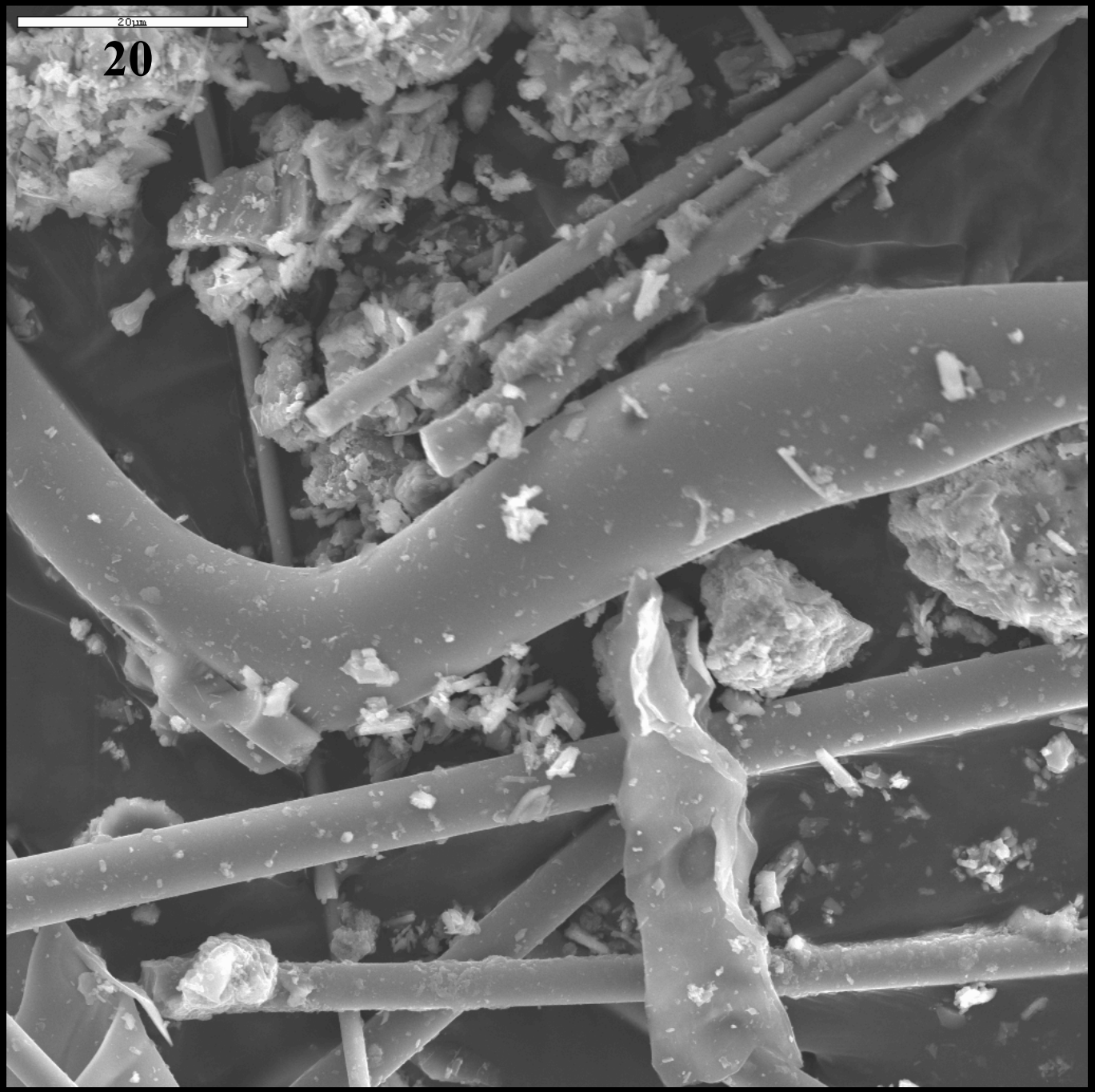
Testing for asbestos (or other identified COPC that may be present in indoor air) as a single trace surrogate will not uniquely identify WTC contamination.

Major components of WTC dust

- man made vitreous fibers 10-50%
- concrete dust
- gypsum


1 mm

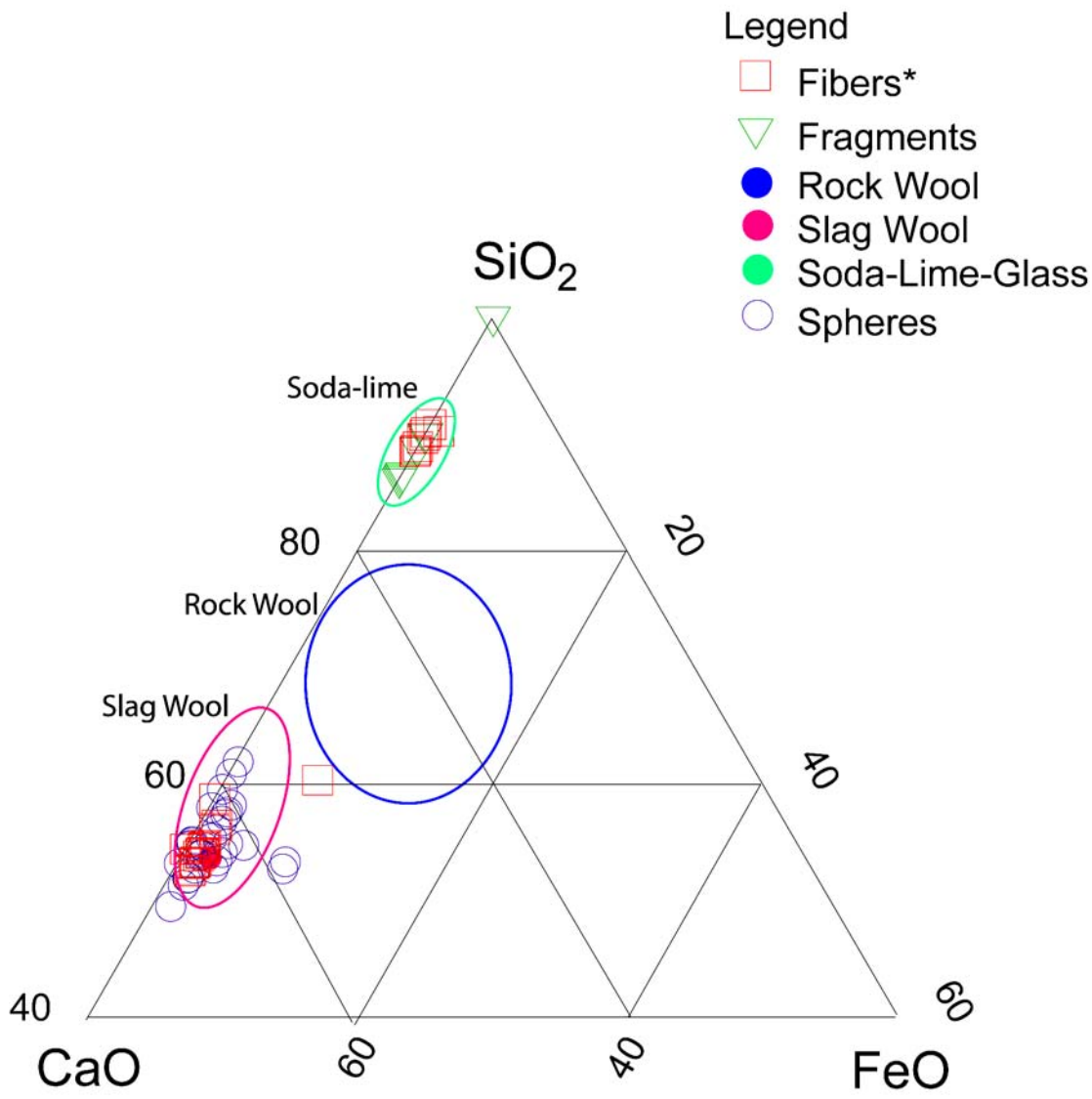

500µm
500


20μm
20

Major Signatures

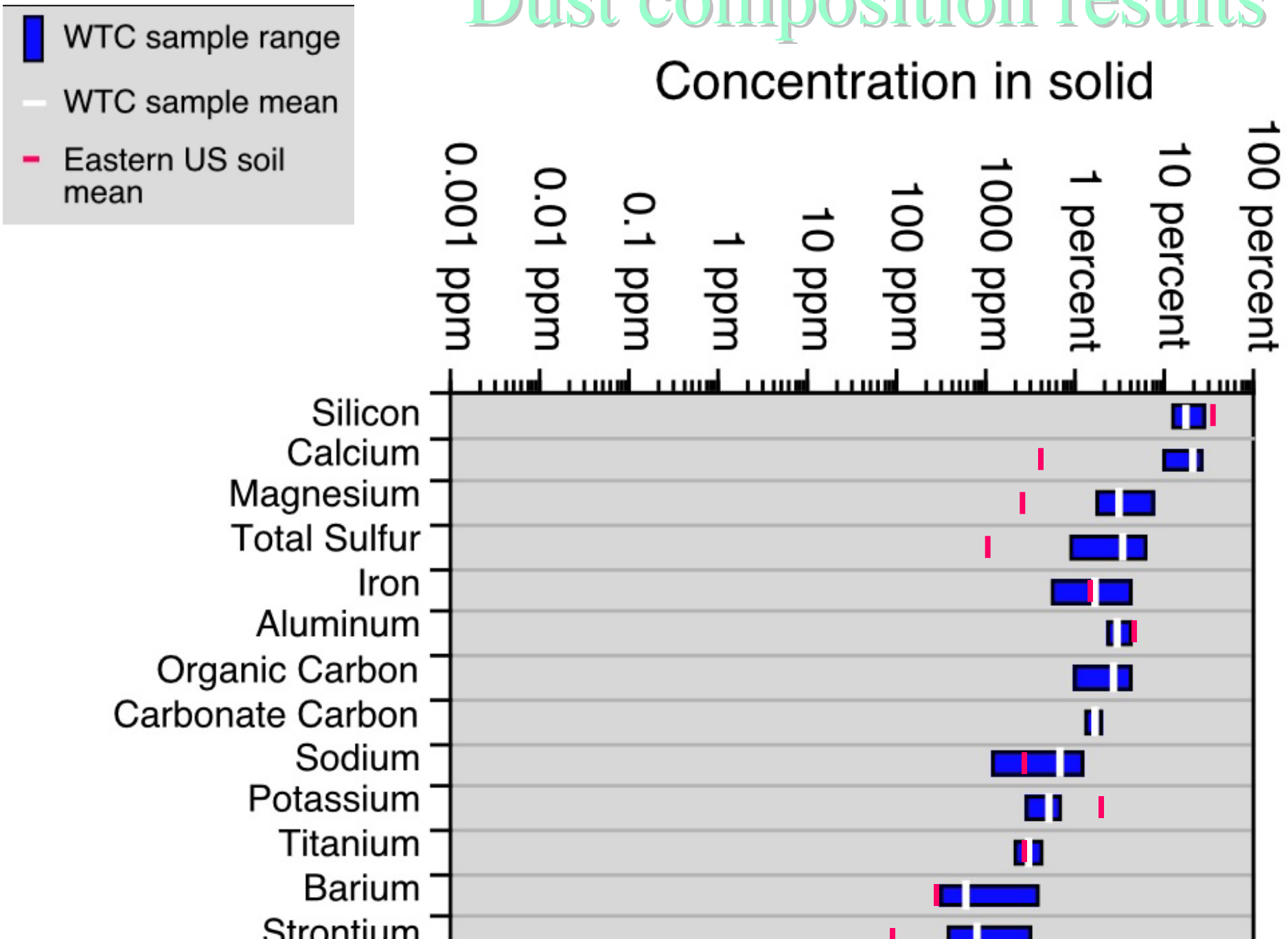
Sample 36 glass analyses by electron microprobe

	fibers								sphere	
F	0.06	0.09	0.30	0.08	0.46	0.31	0.05	0.06	0.00	0.45
Na2O	0.25	0.31	0.23	1.55	0.24	0.19	2.10	0.33	10.17	0.22
MgO	12.16	11.84	10.95	9.07	9.25	6.95	10.62	10.52	3.36	12.47
Al2O3	11.54	12.19	11.94	12.43	9.50	9.39	12.10	9.84	3.67	11.59
SiO2	40.03	40.14	40.85	41.81	42.53	43.00	44.05	44.39	73.02	40.10
P2O5	0.00	0.01	0.00	0.01	0.06	0.04	0.05	0.04	0.06	0.04
SO3	0.87	0.90	0.93	0.80	0.63	1.09	0.05	0.74	0.00	0.74
Cl	0.00	0.01	0.00	0.02	0.01	0.02	0.00	0.00	0.01	0.00
K2O	0.62	0.62	0.57	1.44	0.59	0.49	1.15	0.64	0.75	0.59
CaO	32.52	33.02	33.23	32.21	35.61	37.56	23.54	31.17	7.86	32.99
TiO2	0.62	0.63	0.68	0.51	0.58	0.61	0.83	0.85	0.05	0.58
Cr2O3	0.00	0.00	0.03	0.01	0.00	0.01	0.01	0.03	0.00	0.02
MnO	0.35	0.29	0.27	0.35	0.38	0.31	0.09	0.82	0.02	0.30
FeO	0.77	0.77	0.98	0.51	0.86	0.55	5.28	0.37	0.12	0.57
NiO	0.02	0.00	0.00	0.00	0.00	0.03	0.01	0.01	0.01	0.03
Total	99.80	100.77	100.82	100.74	100.51	100.40	99.92	99.78	99.09	100.50

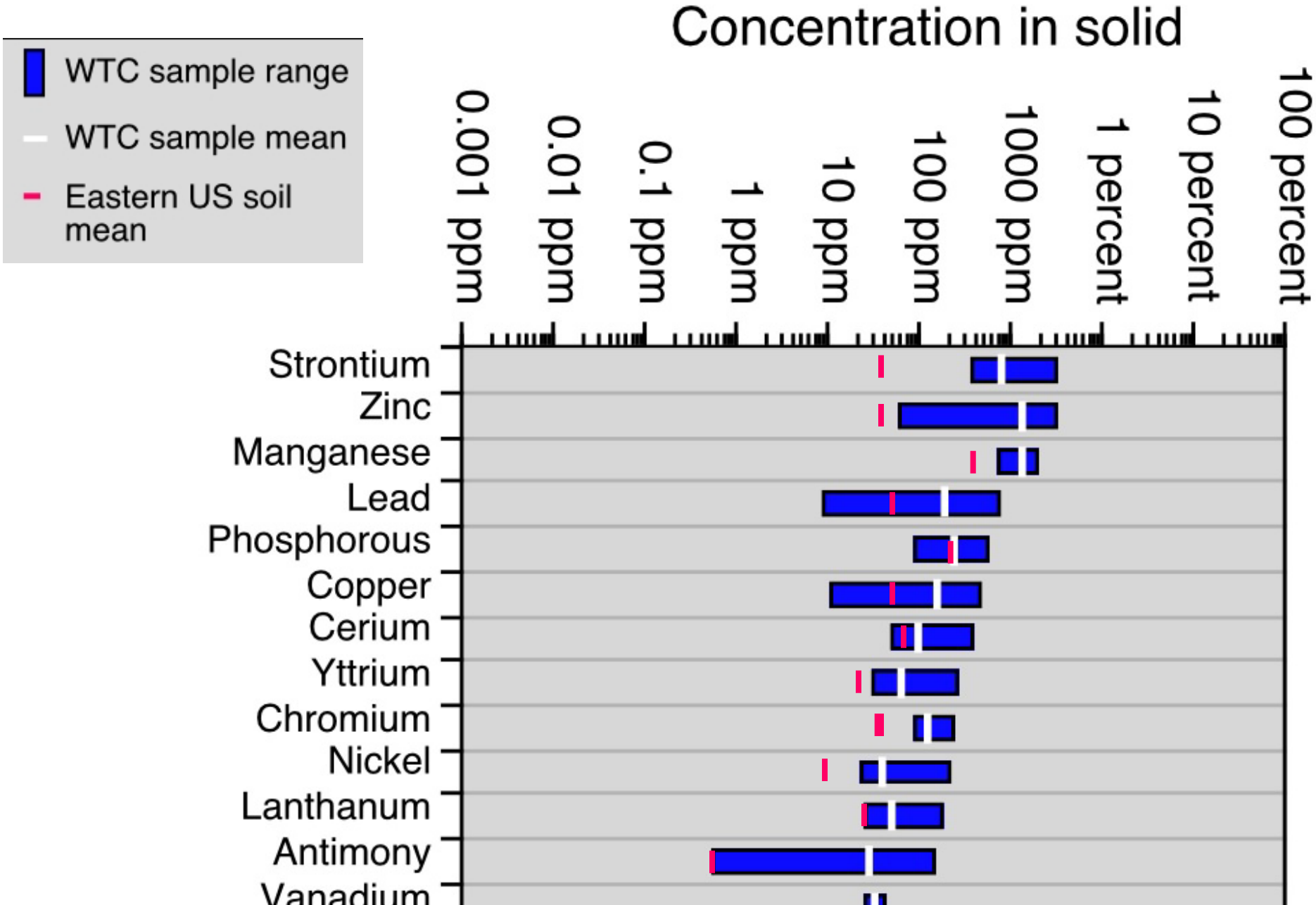

Legend
Fibers*
Fragments
Rock Wool
Slag Wool
Soda-Lime-Glass
Spheres
SiO2
Soda-lime
Rock Wool
Slag Wool
80
20
60
40
40
60
CaO
60
40
FeO

Trace Signatures

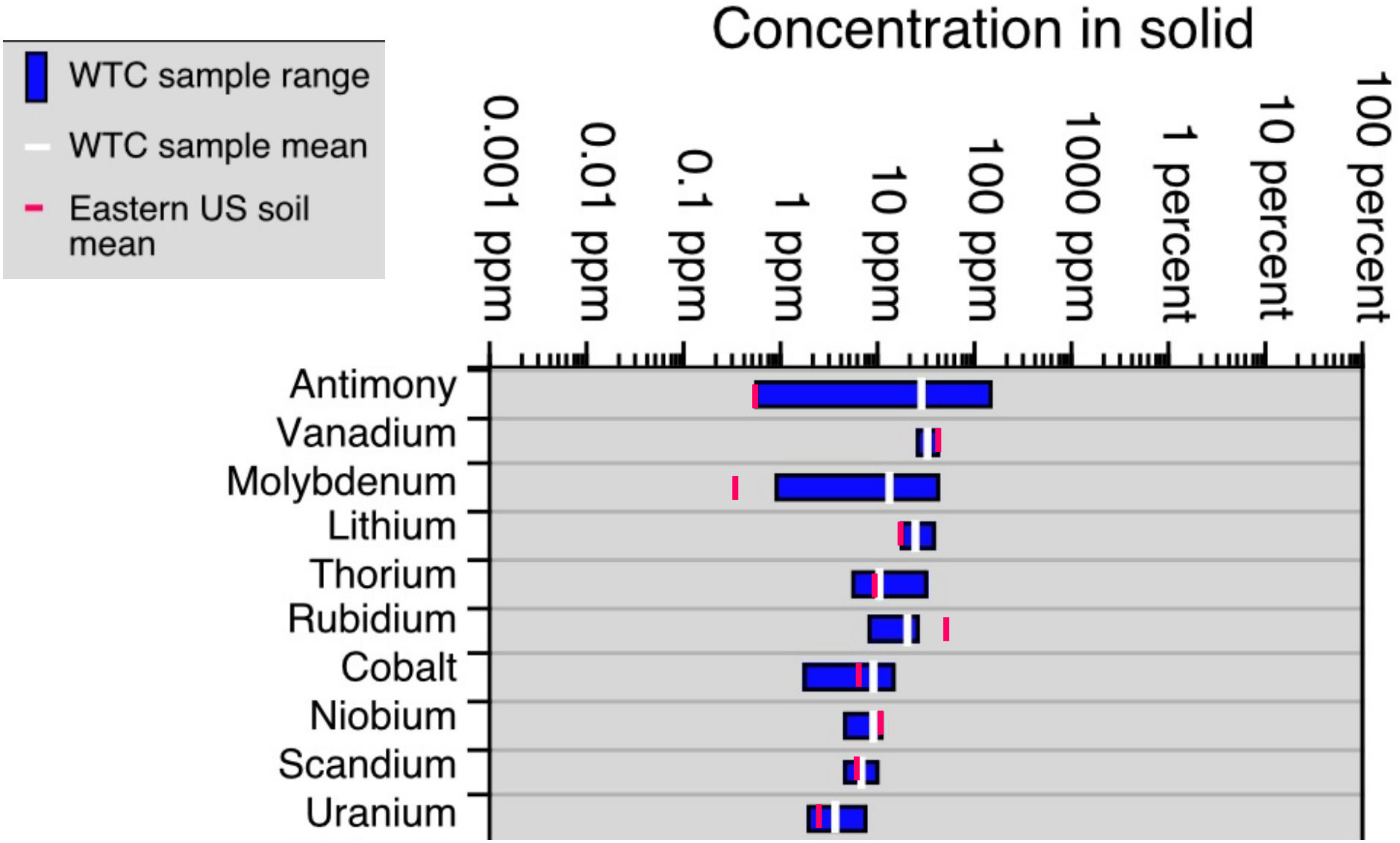
Dust composition results



Dust composition results



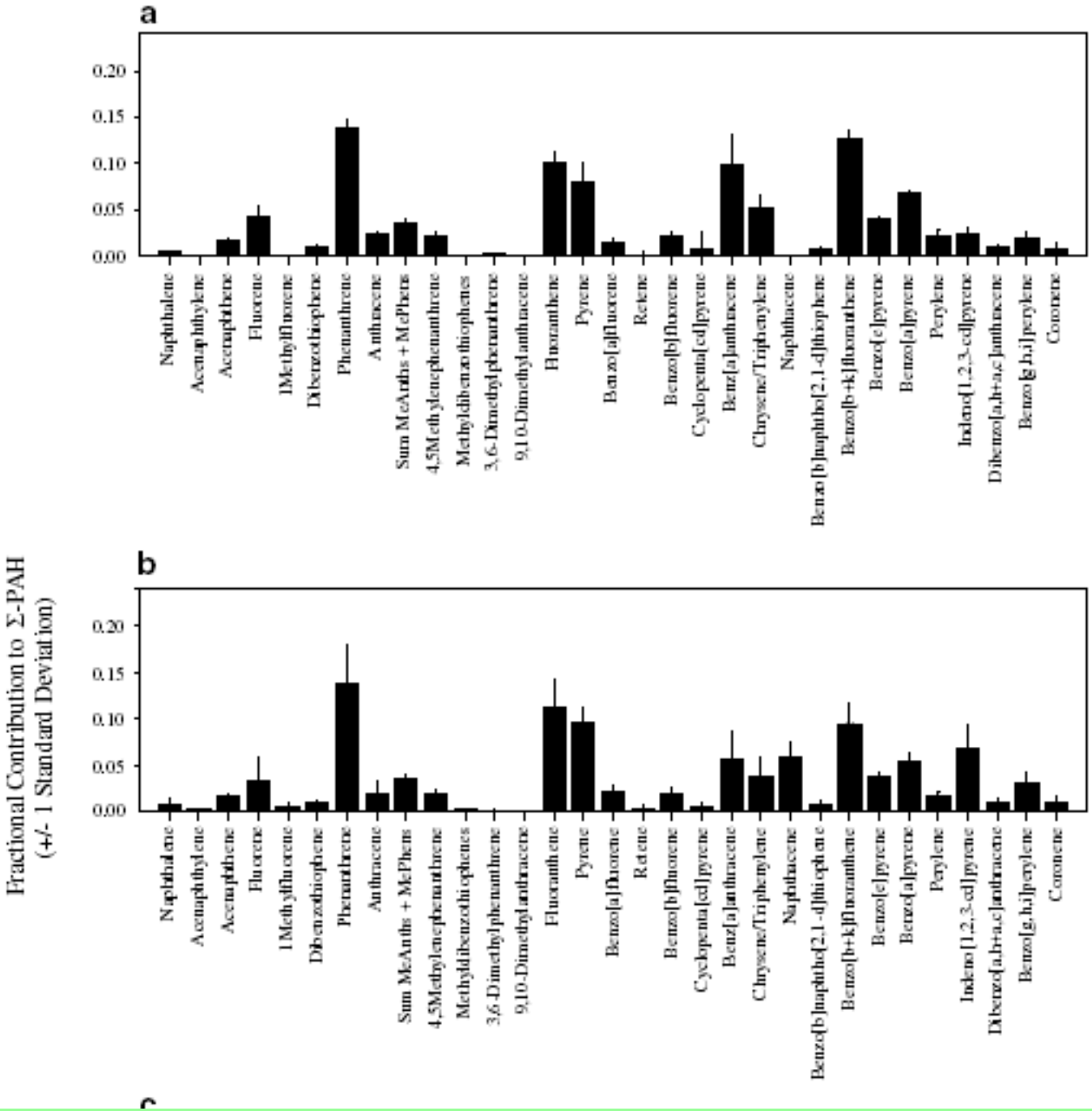
Dust composition results



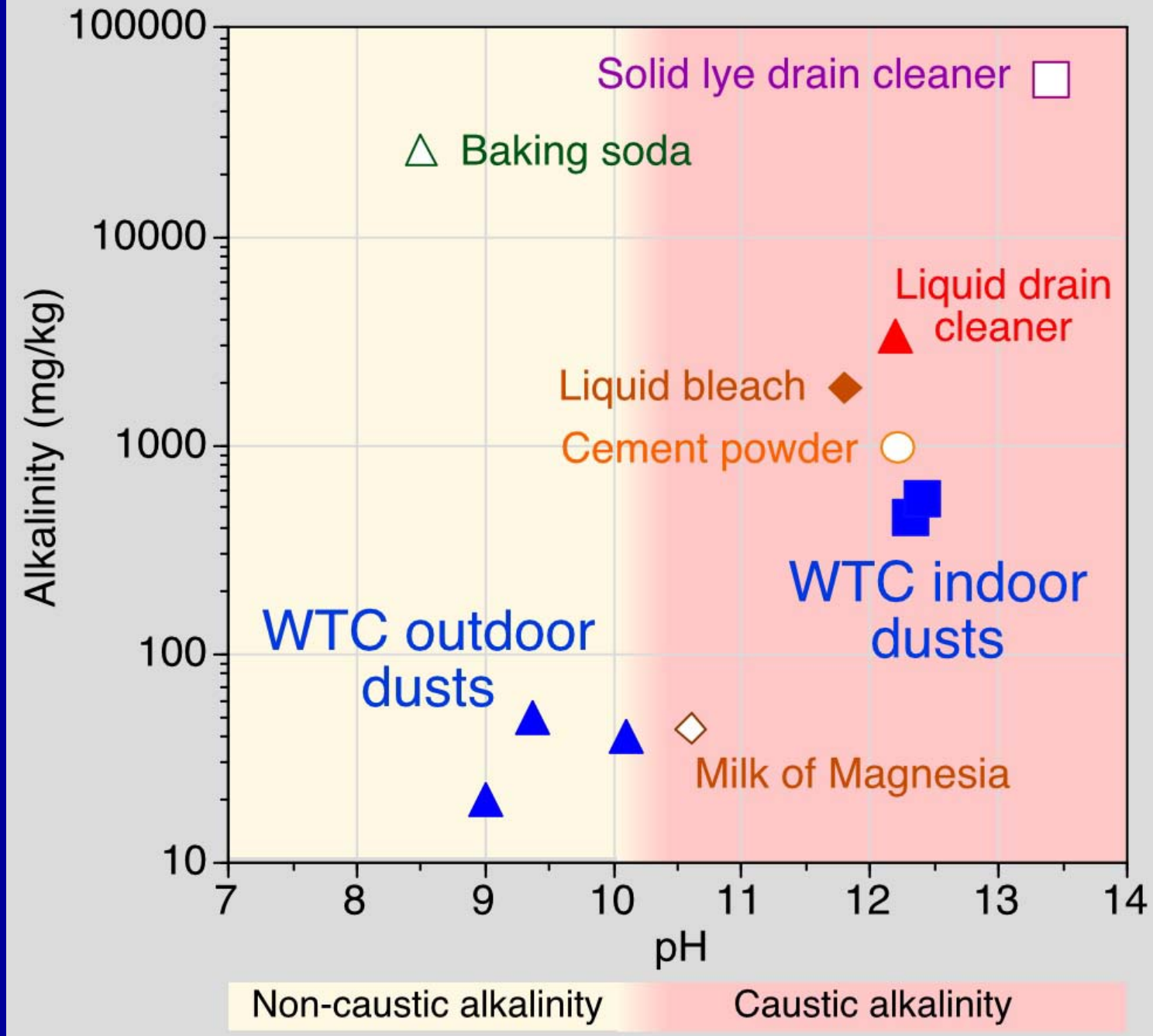
Organic Signatures

PAH Signature

From Offenberg, 2004



Chemical Signatures


Solid lye drain cleaner
Baking soda
Liquid drain cleaner
Liquid bleach
Cement powder
WTC indoor dusts
WTC outdoor dusts
Milk of Magnesia
Alkalinity (mg/kg)
100000
10000
1000
100
10
7
8
9
10
11
12
13
14
pH
Non-caustic alkalinity
Caustic alkalinity

Concerns

All of the major and minor components of WTC dust are common construction materials.

It is almost certain that all buildings and structures in lower Manhattan will be different with respect to materials used, configuration of HVAC systems, condition of interior buildings components, and construction and renovation history.

Tens of thousands of units of housing have been created in what were formerly industrial and commercial structures. The ongoing contamination from this process must be distinguished from the WTC materials.

Proposal

- EPA would immediately initiate a background study. The background study is necessary to insure that the proposed major, minor, and trace signature materials are not common in background samples.
- Study should include reanalysis of previously obtained background samples from the WTC Background Study *and* additional samples collected from a subset of newly defined sampling units as yet to be determined.
- The background study should also include samples previously collected by other agencies such as OSHA, ATSDR and the City of New York.

If background samples look favorable -

- Samples taken from buildings and areas where WTC contamination is known to have been present should be reexamined for the major, minor and trace components to determine if a statistically valid WTC signature is evident.
- If a WTC signature is evident additional samples should be analyzed including air, and surface dust to further define detection limits, general applicability with respect to various sampling units, and typical dust concentration levels.
- The initial analytical tools for this study would be SEM and TEM with x-ray microanalysis. Other analytical tools should be employed as appropriate for identifying trace signature components.

- A survey of commercial, government and academic laboratories and researchers with knowledge of WTC dust should be conducted to determine what additional resources might already exist that could aid in the development of a WTC signature.
- The above studies should be conducted in coordination with this sub-group, the community, and other persons or entities as deemed appropriate by the Panel.
- If the background study shows slag wool to be a common constituent of indoor air and dust, slag wool will probably not work as a signature component and the process should be shifted to concentrate on other possible signatures.