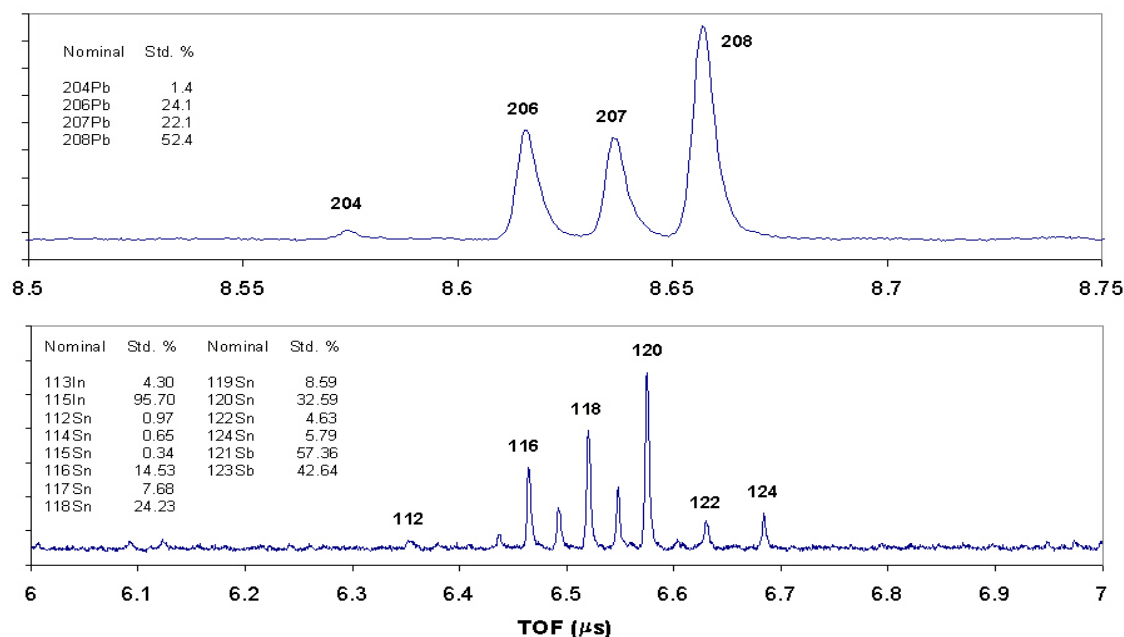
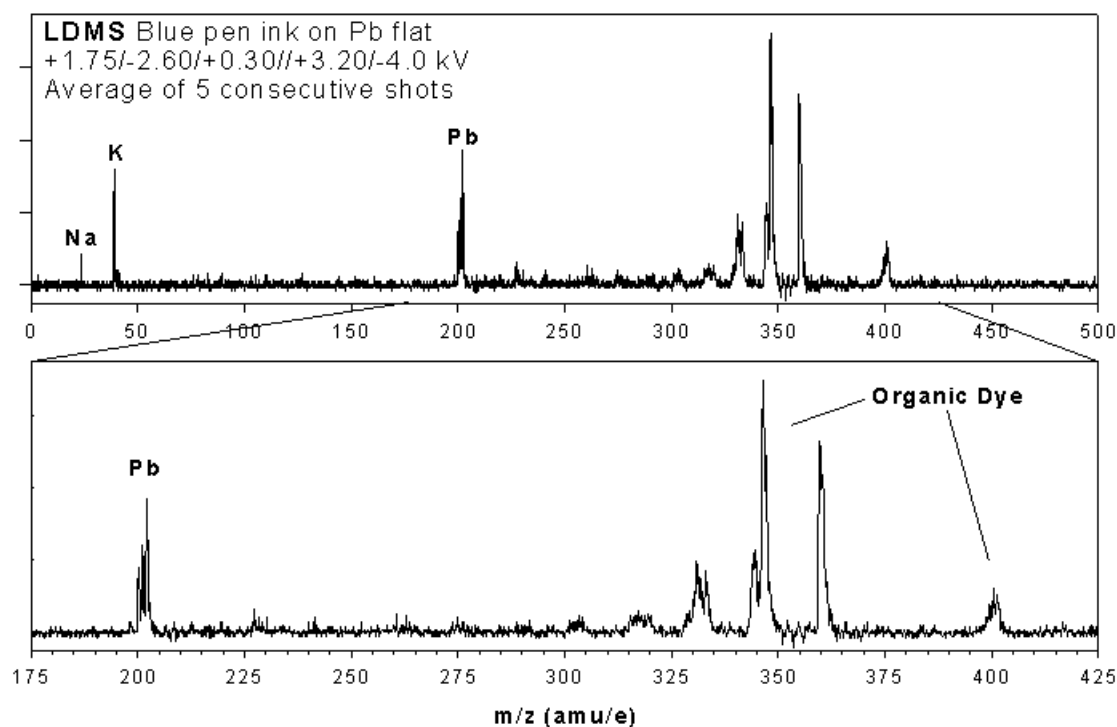


4. TOF-MS with Laser Desorption



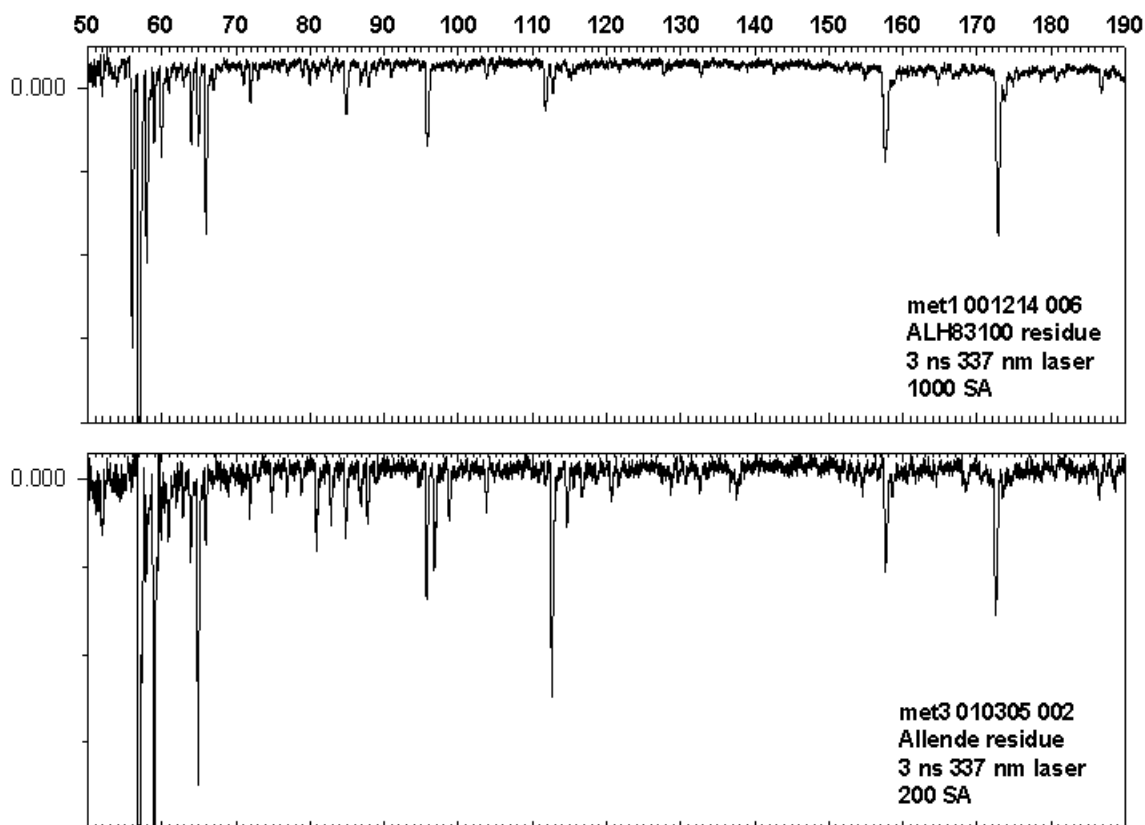
50-shot average LDMS spectrum from Pb-Sn solder. Resolution is



UV LDMS spectrum with simultaneous detection of elemental and organic species (pen ink applied to solder flat).

4. TOF-MS with Laser Desorption

Direct LD-TOF-MS of rough, heterogeneous samples
... a work in progress!



GOAL: *in situ* chemical and organic imaging @ 50 μm

Zagami
1x0.7 cm

grains
~ 50 μm
to 1 mm



5. Technology Challenges and Solutions

Instrument Technology Readiness

(for instruments to probe solid samples at fine scales)

LA-TOF-MS at few-cm standoff: post-PIDDP (fly in 1-2 yr)

- mainly for elemental microprobe analysis
- 2 kg, < 1 W standby, 2-4 W peak (< 2 s)
- instrument length: 20-25 cm

LD-TOF-MS with new reflectron: PIDDP (fly in 2-3 yr)

- adds higher resolution, high mass organic composition
- potentially ~ 1-2 kg, similar power, excluding SVS
- instrument length 15-20 cm
- Value Option Package - MALDI sample preparation (and pinstripes)

Dual Source TOF-MS (LD and EG/EI): PIDDP (fly in 3-4 yr)

- combines volatile and refractory analyses in one probe
- potentially ~ 3-5 kg, 4-5 W, including SVS
- instrument length 25 cm

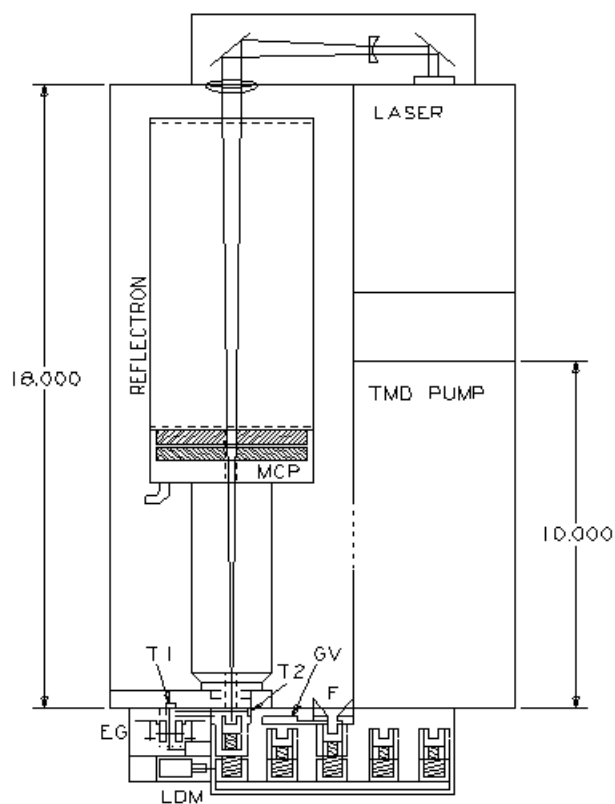
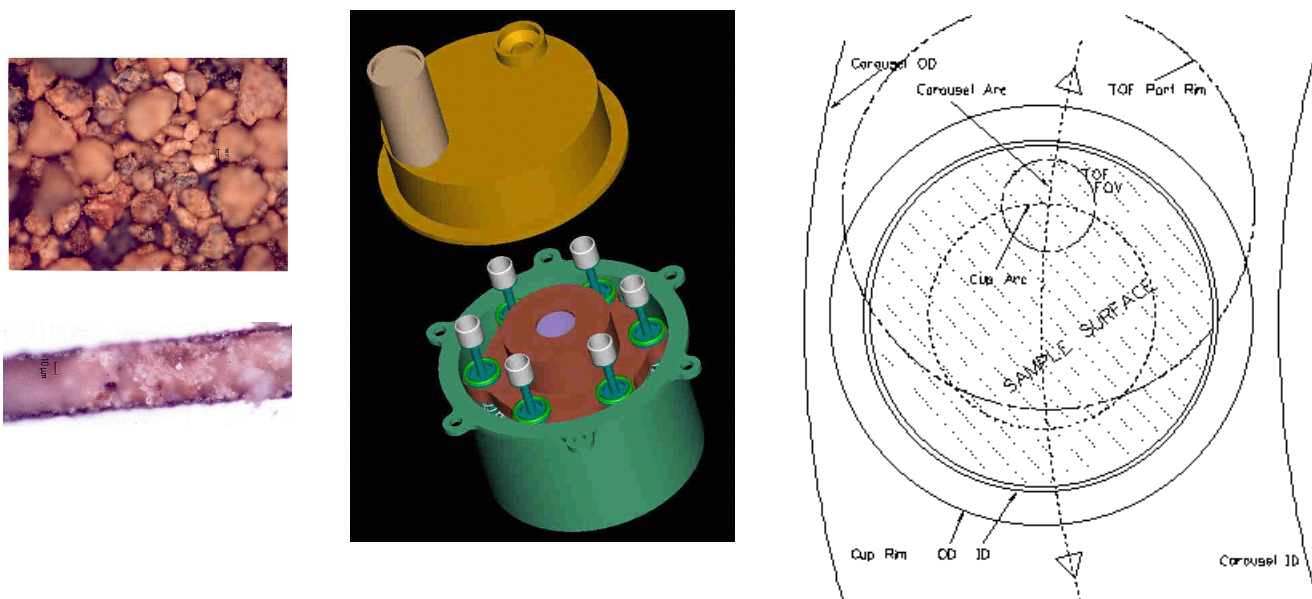
TOF-RIMS with OPO or diodes: Pre-PIDDP (fly in 4-6 yr)

- adds selective compound post-ionization
- potentially ~ 3-5 kg, 4-5 W, including SVS
- instrument length 20-25 cm

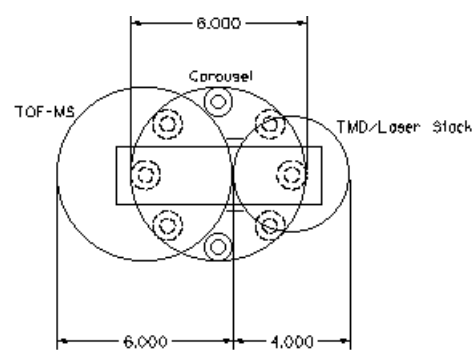
Sample and Vacuum Systems

- Simple expt: No sample acquisition or handling required
- Intensive probes (drill cores, MALDI, chip prep): will require a range of mechanisms, under development at APL and elsewhere

Sample Acquisition and Handling for TOF-MS



Functional schematic of the DSTOF/SHS, side view. Dimensions in cm. MCP microchannel plate assembly; GV gate valve; F funnel inlet; LDM lateral drive motor; EG electron gun; T1, T2 electron traps; TMD turbodrag pump.



Functional schematic of the DSTOF, top view. Dimensions in cm. Horizontal rectangle marks uppermost section containing laser and imager optics.