



## Suib Group

### SIMS Common Applications

### Secondary Ion Mass Spectrometry

Review of analytical results (Rev. 0)



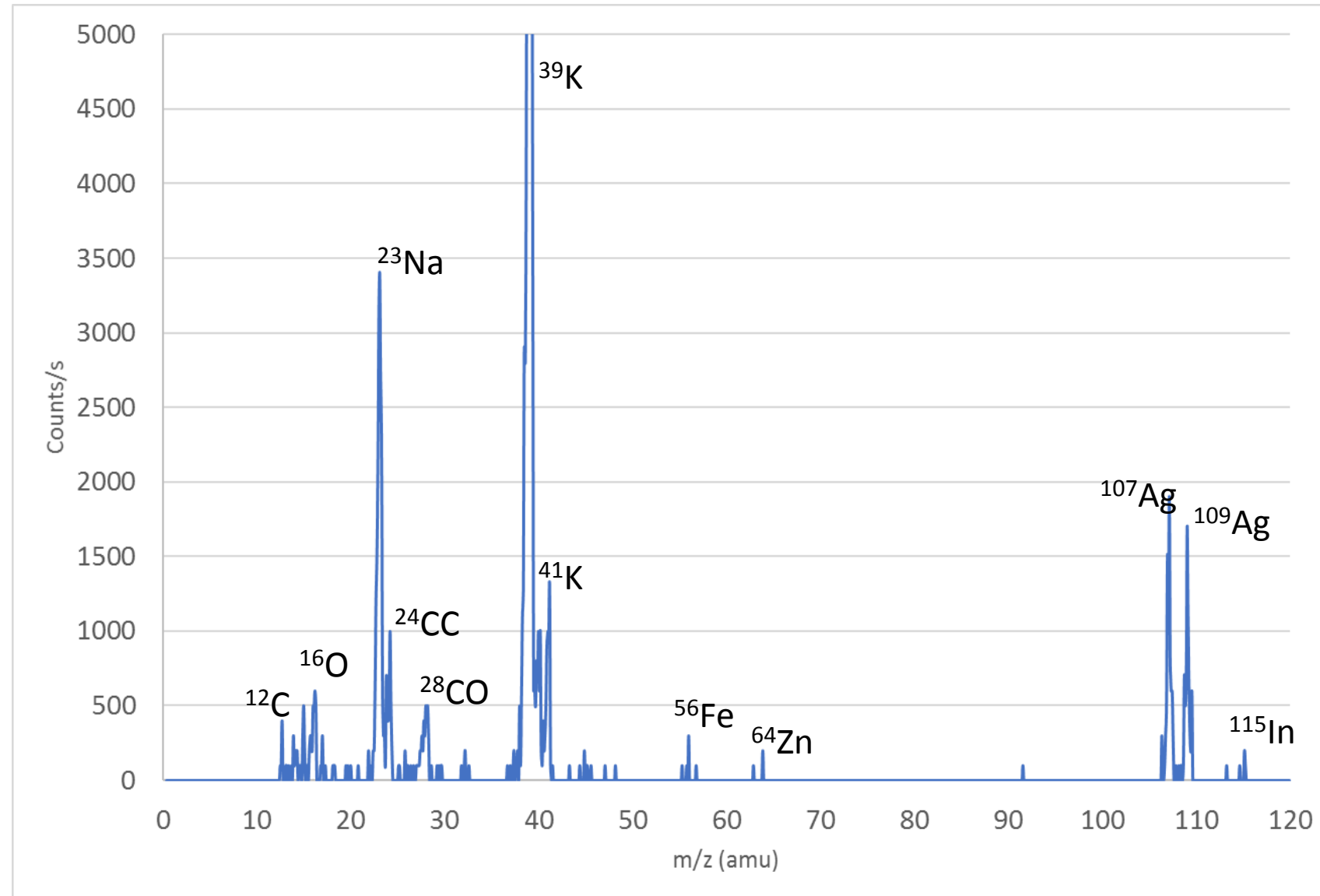
The Suib Group at the University of Connecticut collaborated with Hiden Analytical to determine the effectiveness of Hiden's Compact SIMS analysis system for various research applications. This is a brief summary of the initial results, collected by Peter Kerns, graduate student.



# Surface Contamination on Silver Electrodes

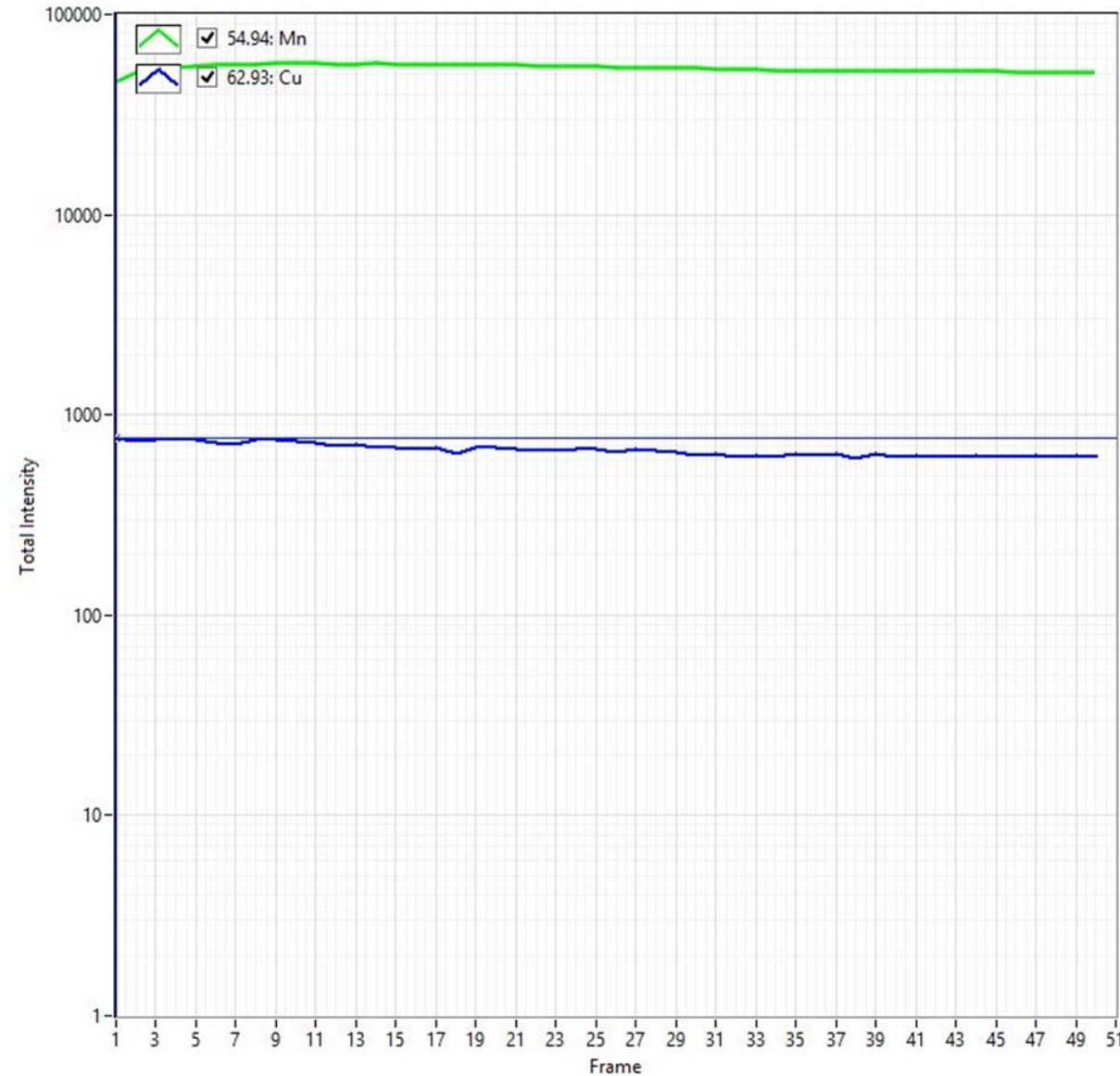
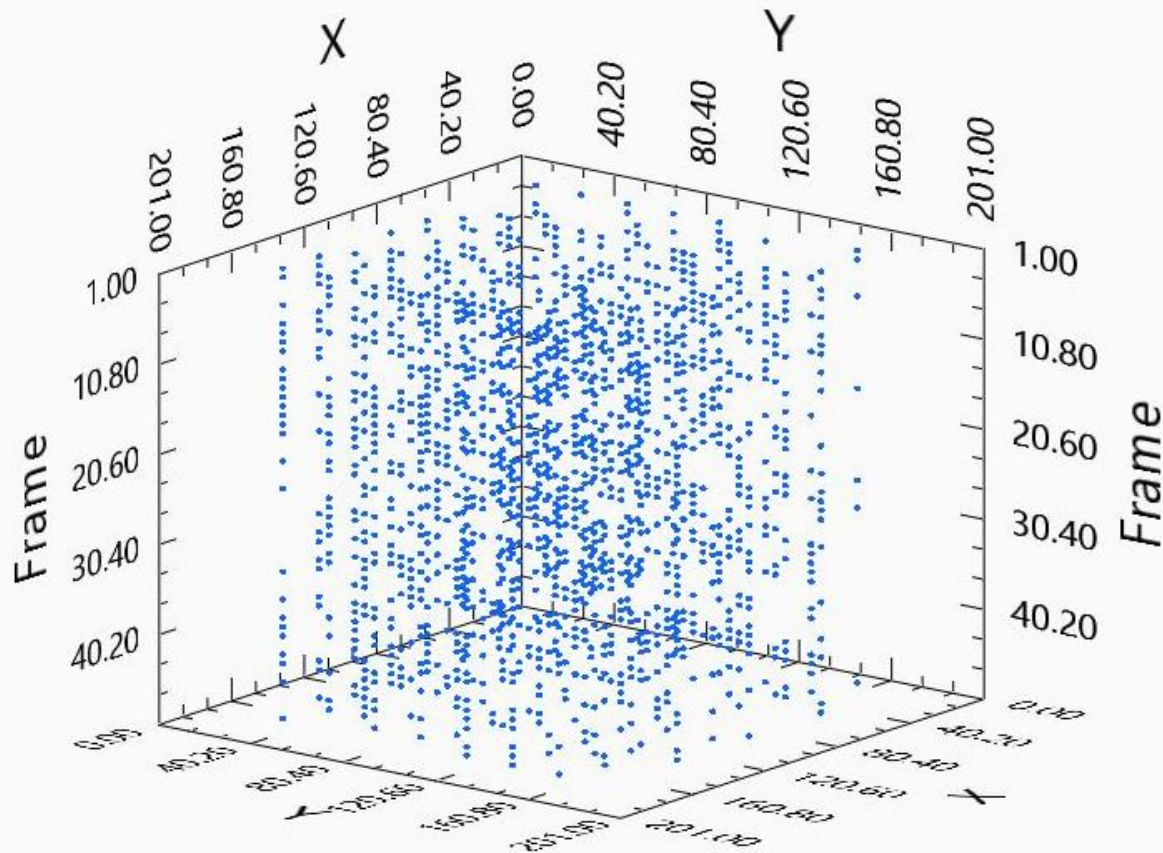
- Compact SIMS has an adjustable ion beam to allow for transition between static SIMS and dynamic SIMS
- Dynamic SIMS is a sputter technique whereas static SIMS looks at the top monolayer of the material

SIMS was able to prove that the electrodes were failing due to carbonate presence and high potassium presence



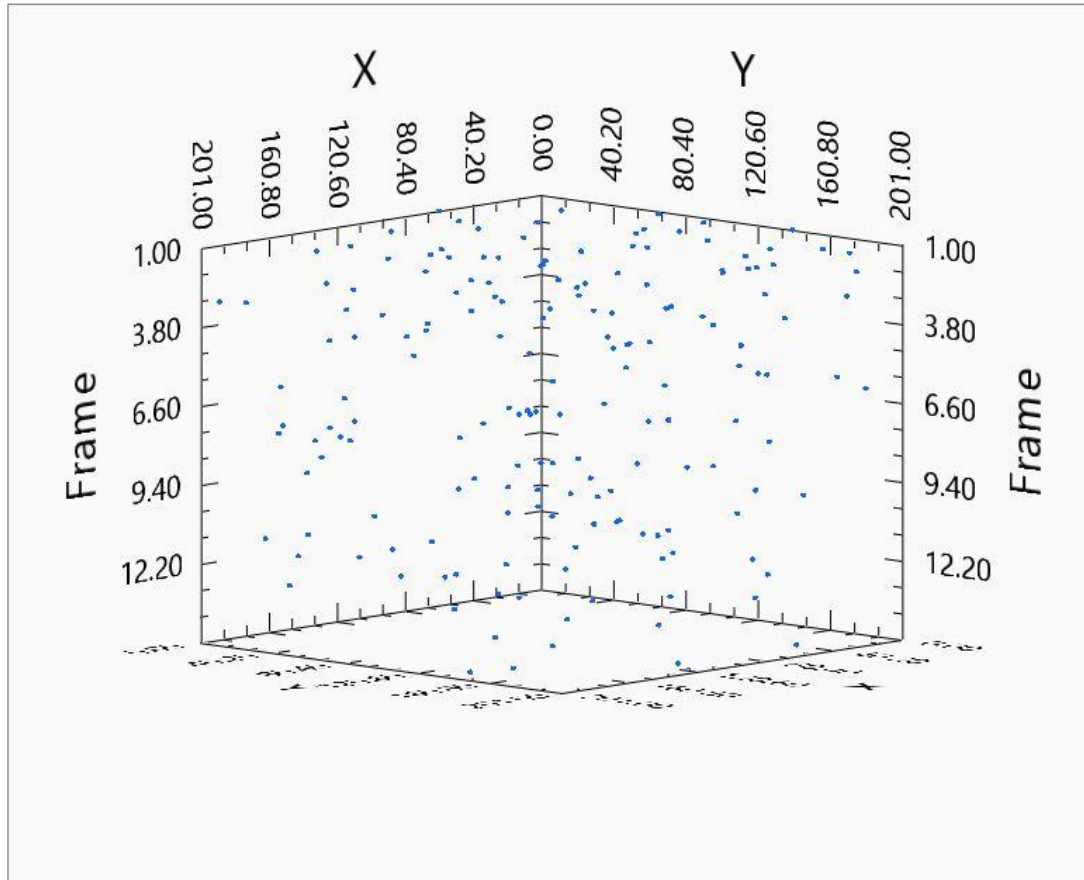
# Catalyst Dopant Homogeneity

- Compact SIMS has the capability to produce a 3D recreation of the catalyst as a depth profile is being acquired

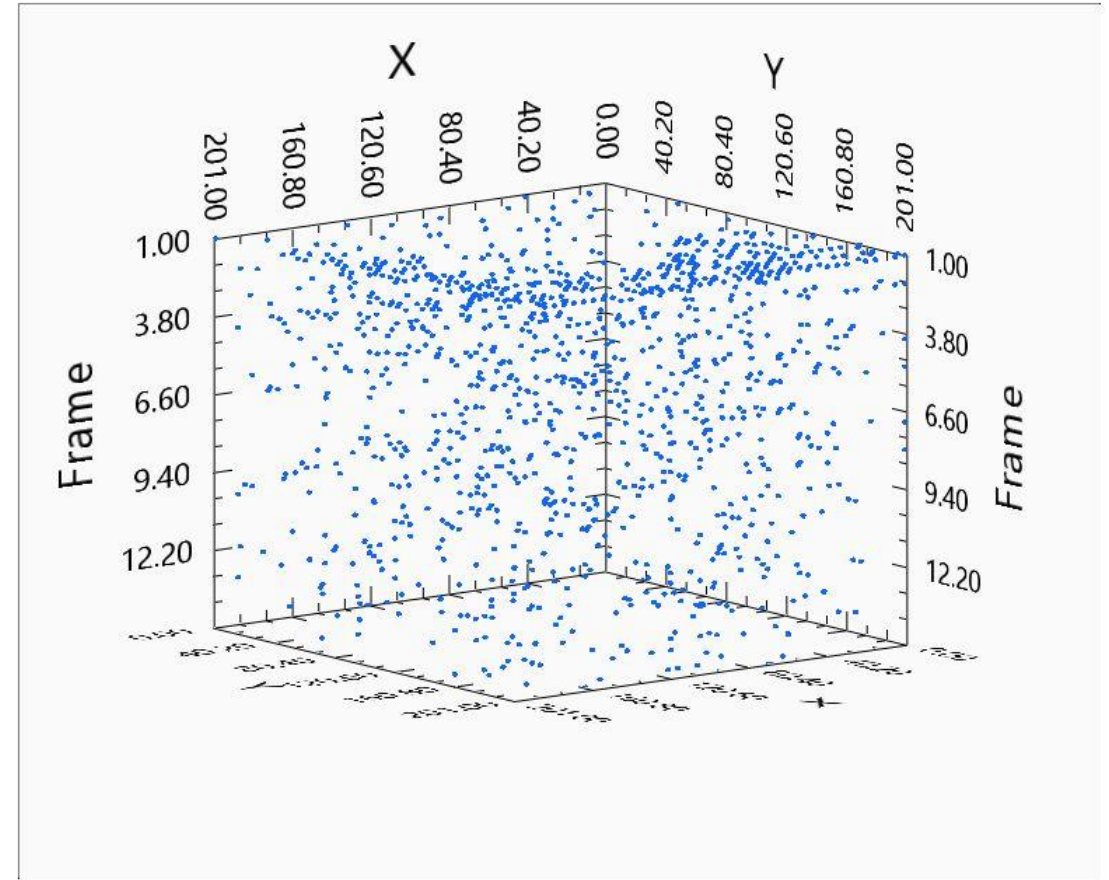


# Carbon Contamination and Removal

Heat Treatment of  $\text{TiO}_2$   
Catalyst at 500C



Heat Treatment of  $\text{TiO}_2$   
Catalyst at 200C

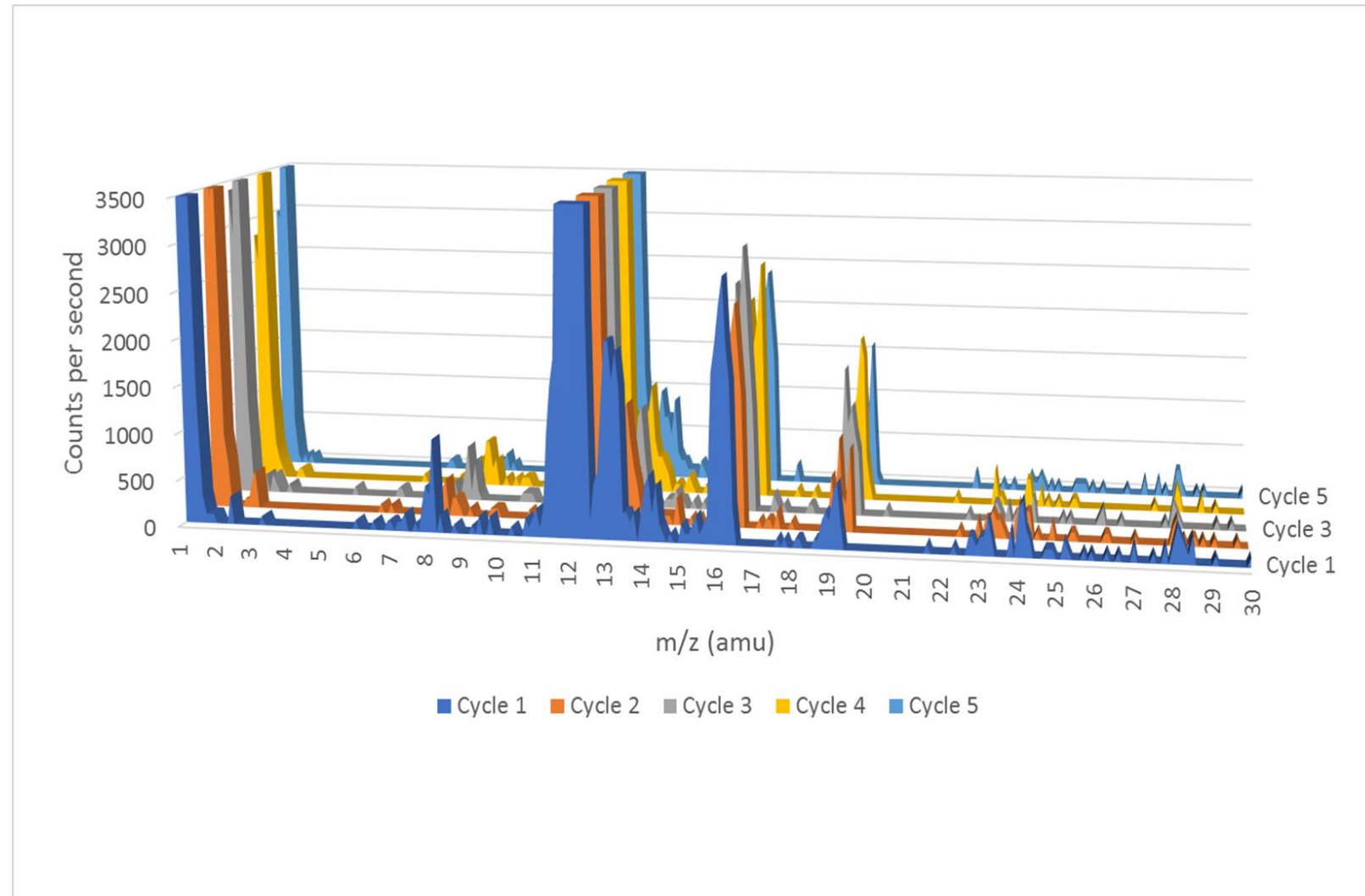




# Urethane Tubing Chemical Attack

- Dynamic SIMS was utilized to examine the removal of the antioxidant protective layer due to ozone exposure on the top few layers of the material
- The electron gun attachment allows for surface analysis of a highly insulating sample such as urethane tubing

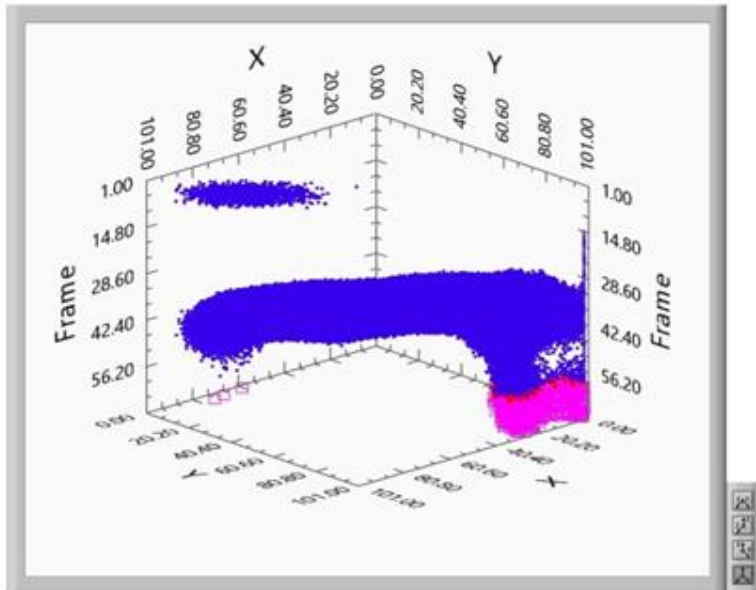
Demonstrated that since the antioxidant protective layer is being removed, the urethane is open to more chemical attacks. This, combined with the mechanical stress it is already under, caused the tubing to fail.



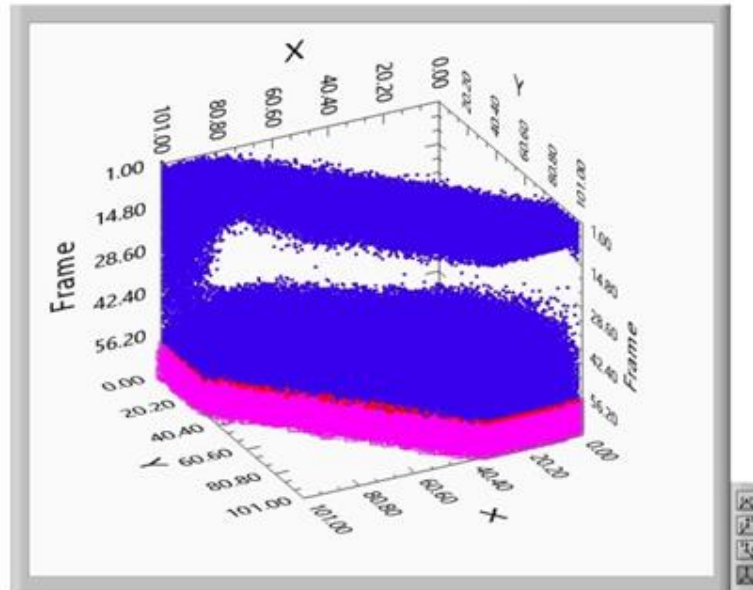
# Future Applications

- Isotope studies on metal oxide catalysts
- Elemental imaging on ink jet printed thin films
- BN/SiC and TiC/C coated fiber surface mapping

Boron coating



Silicon background





# Suib Group

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