# Issues for reticle cleaning

- for DUV lithography

  Phase and transmittance change

  Surface contamination

- for VUV lithography

  Phase and transmittance change

  Surface contamination

  ESD

- for EUV lithography

  Reflectance change

  Affect of debris?

SPM + APM

SPM + APM + HOT DI Rinse

Ozone + H2 water

and

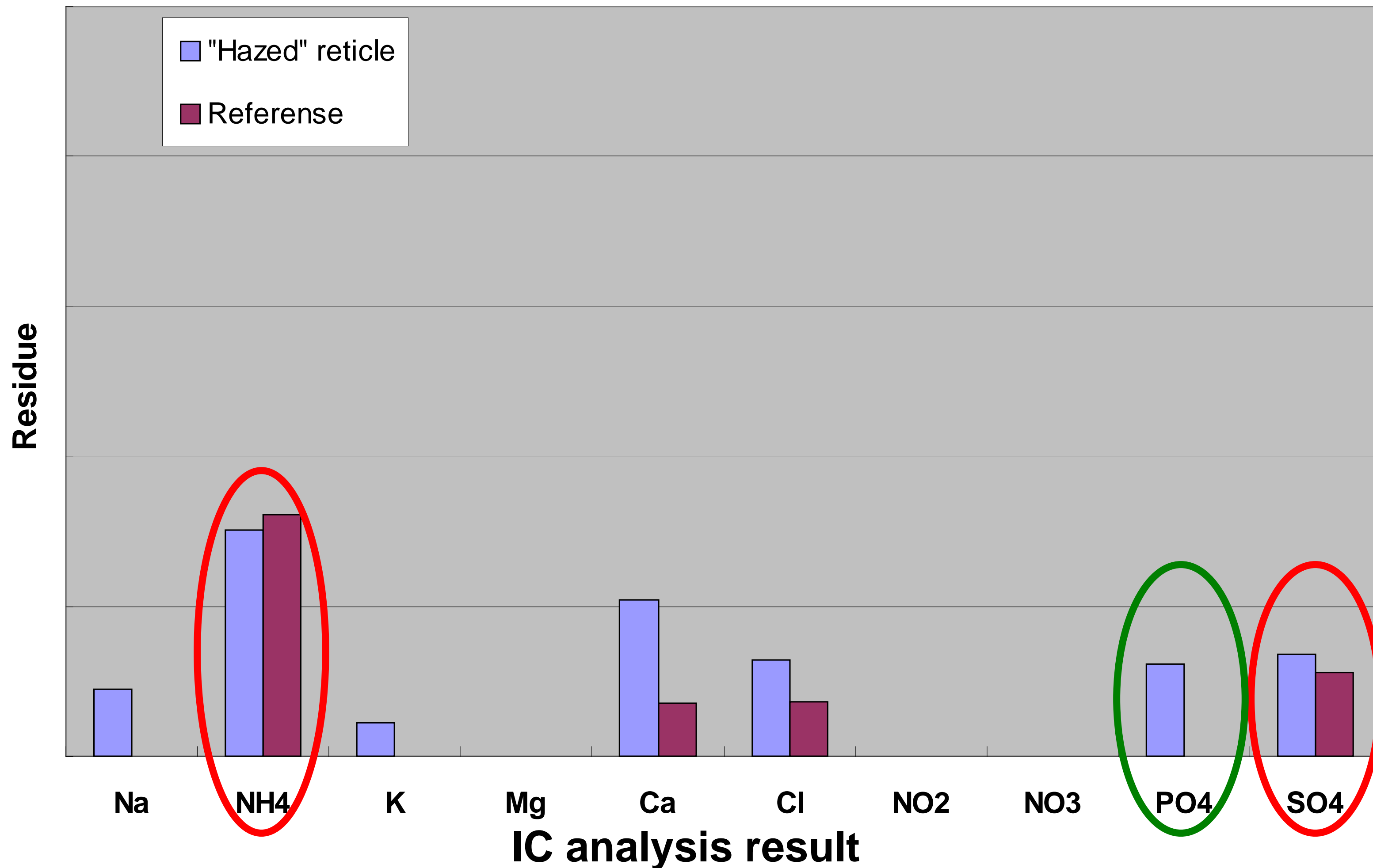
Optical Cleaning

and / or

What else?

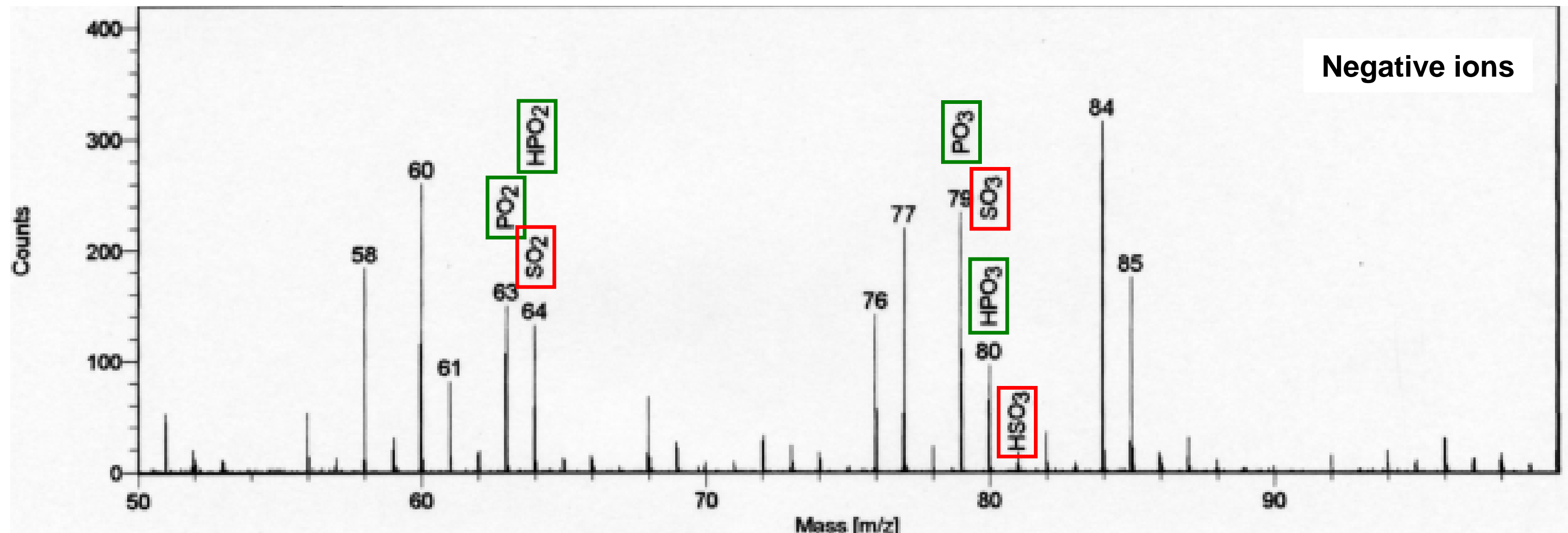
# Haze issue for DUV lithography ~ 1 ~

## $NH_4$, $SO_4$ and $PO_4$ has been detected by IC analysis.



# Haze issue for DUV lithography ~ 2 ~

SOx and POx has been detected by TOF-SIMS analysis.




TOF-SIMS analysis result

SOx free cleaning process has to be applied at mask house.

We ALSO need to reduce POx to avoid haze formation.