

# Structure Determination of $\text{Ag}_n^{+/-}$ cluster ions ( $19 \leq n \leq 79$ ) by Trapped Ion Electron Diffraction.

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The structures of silver cluster ions are studied by the recently developed technique of trapped ion electron diffraction (TIED) [1]. In brief, cluster ions are generated by a magnetron sputter source [2] and injected into a Paul ion trap. After mass selection and thermalization the trapped ions are irradiated with a 40 keV electron beam and the resulting diffraction pattern is integrated with a CCD detector. The sensitivity and resolution of the apparatus is documented by figure 1 which shows the molecular scattering function obtained for  $\text{Ag}_{55}^+$  at 90K.

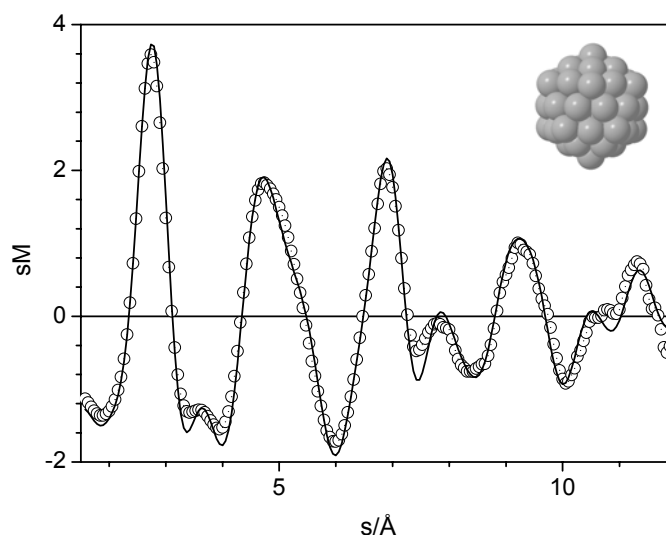


Figure 1: Experimental reduced molecular diffraction intensity (open circles) of mass selected  $\text{Ag}_{55}^+$  at 90K. The measurement is fully consistent with an icosahedral structure (inset) as determined from RIDFT calculations (line).

Comparison to DFT structure calculations for various trial geometries reveals that the cluster ensemble which was probed comprises predominantly icosahedral  $\text{Ag}_{55}^+$ .

## References

- [1] M. Maier-Borst, D. C. Cameron, M. Rokni and J. H. Parks, *Physical Review A*, 59, R3162 (1998), S. Krückeberg, D. Schooss, M. Maier-Borst, J. H. Parks. *Phys. Rev. Lett.* 85(21), 4494-4497 (2000)
- [2] H. Haberland, M. Mall, M. Moseler, Y. Qiang, T. Reiners and Y. Thurner, *J. Vac. Sci. Technol. A* 12(5), 2925 (1994)