



Frontiers in Atmospheric in-situ Microscopy

Over the past decade new innovations have transformed the transmission electron microscope from a high-resolution image acquisition tool into a nanoscale materials R&D laboratory, commonly called environmental TEM or E-TEM. These innovations are fueled by the demand to better understand material behavior in realistic gas environments in applications such as heterogeneous catalysis and nanostructure nucleation and growth. In fact, researchers can now image samples at atomic resolution in environments that well match real world gas reaction conditions. Studying materials in this way can vastly improve the speed and efficiency by which new nanomaterial properties are uncovered and ultimately used in commercial applications.

The Protochips Atmosphere 200 Gas E-cell is our newest in situ electron microscopy solution, and combines our patented MEMS technology and holder-based closed cell design with innovative software and gas handling hardware. This technology allows atomic-scale resolution at gas pressures up to 1 atm and sustained temperatures up to 1000°C with extremely low drift and closed-loop temperature control, and is compatible with the common analysis tools including EDS and EELS. Fully automated software makes the system quick to learn, easy to use and control, and safe.

During this workshop we review the most recent results using the Atmosphere system, and describe research in heterogeneous catalysis for automotive exhaust control, graphene etching experiments under highly controlled conditions, and hydrogen storage studies. An overview of the Atmosphere system, including both the hardware and software, will also be provided.

Protochips, Inc. is an established growth stage company focused on developing analytical tools for understanding nanoscale materials by providing stimulus in their natural environments. The company supports product developers and researchers in both materials and life sciences fields.