

ALD

ATOMIC LAYER DEPOSITION – VACUUM PROCESSING OF THIN FILMS



Hidden's extensive range of systems for ALD Process and Film Analysis

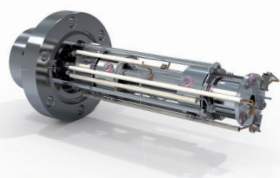
Atomic Layer Deposition (ALD) is a ground-breaking method extensively employed in high-tech sectors such as electronics, energy, and materials science for fabricating ultra-thin, uniform films crucial to semiconductors, solar cells, and nanomaterials. Comprehending the film growth mechanisms is vital for ensuring precision and quality.

Hiden Analytical systems - HPR-30, EQP, HMT, and AutoSIMS - play a significant role by providing unmatched insights into ALD, supplementing traditional analytical techniques like X-ray diffraction and scanning electron microscopy.



HMT

Residual gas analysis at high pressure



The Hiden HMT system provides an innovative approach to residual gas analysis in ALD, enabling real-time process monitoring from pressures of 5×10^{-3} mbar to UHV.

- ▶ HMT mode for high pressure operation to 5×10^{-3} mbar
- ▶ RGA mode for high sensitivity operation to 10^{-13} mbar
- ▶ 100 amu mass range
- ▶ Stability better than $\pm 1\%$ over 24 hours
- ▶ Fast access mixed mode scanning
- ▶ Real-time background subtraction

AutoSIMS

ALD film analytics



The Hiden AutoSIMS revolutionises surface analysis, providing information about the elemental composition and structure of material surfaces, a critical aspect in ALD.

- ▶ Composition, contamination, diffusion and interface analysis
- ▶ Nanometre depth resolution
- ▶ Fully automated, unattended, SIMS & SNMS Analysis
- ▶ 3D Characterisation and imaging

HPR-30 Series

Vacuum process gas analysis – wide sampling pressure range



The Hiden HPR-30 is a mass spectrometer designed for gas analysis in ALD, providing real-time measurements to optimise deposition conditions and monitor gas impurities. It is especially useful in ALD studies.

- ▶ Pump-down profiles
- ▶ Vacuum diagnostics
- ▶ Real-time precursor analysis
- ▶ Residuals
- ▶ Backfill
- ▶ Bakeout endpoint confirmation
- ▶ Leak checking

EQP Series

Analysis of the reaction kinetics of plasma assisted ALD processes



The EQP system is a specialised plasma analyser used in plasma-assisted atomic layer etching (ALE) and ALD. It tracks high-density plasma, enabling the creation of uniform patterns and monitoring plasma ions, radicals, and neutrals for reproducibility and contaminant monitoring.

- ▶ +ve and -ve ion analysis
- ▶ Mass resolved ion energy analysis
- ▶ Neutrals and neutral radical analysis
- ▶ Energy resolved mass analysis
- ▶ Mass range options to 1000 amu
- ▶ Energy range options to 1000 eV