



CVD/ALD Developments for Safety, Performance & Affordability
Jean-Marc Girard, Ph.D., CTO, Air Liquide Advanced Materials

The transition towards new architectures in advanced devices, whether in memory or logics, has led to the adoption by the industry of numerous new CVD/ALD precursors, and the roadmap is pointing at yet another wave of introduction, driven by further materials innovation (high mobility channels, new BEOL metals, super high-ks, active layers for emerging memories, selective deposition schemes, etc.).

Most of the needed new precursors require a quasi ab-initio manufacturing and supply chain development, with extremely reduced delay between the selection of the right molecule among tens of candidates during the R&D screening phase and the need for it to be at scale for high volume manufacturing. Additionally, Change control and ramping speed requirements throughout the early life of the product are straining the usual learning cycles of new chemical developments, and lead to a higher risk of selecting the wrong molecule, and/or qualifying a costly product (inefficient synthesis, costly packaging & dispense solution, etc).

Through selected examples, the presentation will address the challenges of providing new precursors to the IC industry. These examples will show how chemistry & packaging innovation, as well as a deep understanding of the chemical supply chain in other industries can improve safety, performance and affordability, and how a rigorous stage-gate process allows synchronizing the chemical development with the customers' needs.