Seminars at the Melbourne Centre for Nanofabrication

Atomic layer deposition as an enabling nanotechnology

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Abstract:

Atomic layer deposition (ALD) is a true enabling nanotechnology that allows for the preparation of high-quality thin films on challenging surface topologies with excellent step coverage and precisely controlled nanometer dimensions. The semiconductor industry has been the main driving force behind the industrial implementation of ALD in high-volume manufacturing in the last 2 decades, not only in the materials- and 3D-enabled scaling but also in the litho-enabled scaling. Furthermore, ALD has become critical in many more applications including power electronics, microsystems, solar cells, batteries, etc.

In this presentation, the method of ALD will be introduced including a description of its underlying mechanisms, key features and applications. Subsequently some relevant developments in the wider field of atomic scale processing will be discussed.

Erwin Kessels is a professor at the Eindhoven University of Technology TU/e and he is the scientific director of the NanoLab@TU/e clean room facilities. Erwin received his M.Sc. and Ph.D. degree in Applied Physics from the TU/e in 1996 and 2000, respectively. His research interests cover the field of synthesis of ultrathin films and nanostructures using methods such as (plasma-enhanced) atomic layer deposition (ALD) and atomic layer etching (ALE). With 20+ years of experience in the field of ALD, he has contributed most prominently by his work on plasma-assisted ALD, his research related to ALD for semiconductor technology and photovoltaics, and ALD for nanopatterning (including area-selective ALD). Erwin has won several awards (the AVS Peter Mark Memorial Award in 2007; the ALD Innovation Award in 2019) and he has organized various conferences in the field of ALD and ALE. He is an associate editor of the Journal of Vacuum Science and Technology. He is also the driving force behind the AtomicLimits.com blog and the founder of the ALD Academy.