



innoLAE 2023

21 February 2023
Hinxtan Hall Conference Centre



Wet and Dry Processing Technologies For Large Area Electronics

innoLAE (Innovations in Large-Area Electronics) is pleased to again provide two short courses on fabrication and processing technologies on the day preceding the innoLAE 2023 conference.

Dry Processing Technologies for Large Area Electronics

The Dry Processing Short Course covers the key processing techniques required for large area electronic device manufacture, including vacuum deposition, photolithography, laser ablation and wet and dry etching. In each case the advantages, disadvantages and technological challenges of each technique will be covered, along with issues arising in scale up for manufacture.

Wet Processing Technologies for Large Area Electronics

The Wet Processing Short Course is delivered by Printed Electronics Ltd (PEL). It covers the inks and printer technology required for deposition techniques including screen, inkjet and flexo/gravure printing. The short course also covers coating techniques such as doctor blade and slot die, drawdown, spin and spray coating. In each case the advantages, disadvantages and technological challenges of each technique will be covered, along with issues arising in scale up for manufacture.

Dry Processing Technologies for Large Area Electronics

Tuesday 21 February 2023

08:00 – 09:00 Registration
09:00 Course begins

Dry Processing (Thin Film Fabrication and Patterning) - CPI

Vacuum Deposition - CPI

- Physical vapour deposition
- Chemical vapour deposition
- Description of evaporation process
- Description of sputtering process
- Comparison of evaporation vs sputtering
- PVD chamber design
 - Requirements for a process chamber
 - Discussion on vacuum pumps types
 - Discussion on power supplies
- PVD process conditions
 - Pressure, time & power vs deposition rate & thickness
 - Magnetron sputtering
 - Metal vs reactive sputtering
 - Target types
- Description of ALD process
 - ALD cycle
 - Temporal vs spatial ALD
 - Current tool types

Photolithography Processes - CPI

- Photo processes
 - Positive and negative resists
 - Lift off resists
 - Image reversal resists
 - Cured dielectrics
 - Hard mask process
 - UV-NIL

Photolithography Processes - Continued

- Photo tool set
 - Spin Coating
 - Alignment
 - Maskless photolithography
 - Developing photoresist
- Common issue considerations
 - Resist adhesion
 - Reflectivity of the material or underlying material
 - The planarity of the material
 - Etch characteristics of the material
 - Resist removal method
 - Thermal stability of sublayers and deposited material
 - Exposure factors

10:00 - 10:30 Coffee break

Laser Processing for Ablation and Patterning

Etching Processes - CPI

- Differences between wet and dry etching
- Isotropic versus anisotropic
- Typical wet etch chemistries
- Typical wet etch problems
- Plasma etch fundamentals
- Selectivity, etch rate, uniformity
- Steps in a plasma etch process
- Typical plasma chemistries

Integration - CPI

- Brief overview of the CPI integration facility
- Case studies

12:30 Course ends



Wet Processing Technologies for Large Area Electronics

Tuesday 21 February 2023

12:30 – 13:30 Registration
13:30 Course begins

Wet Processing (Formulation, Coating and Printing) - PEL

Materials and Formulation

- Inks
 - Silver, copper, carbon and other ink materials
- Formulation
 - Rheology
 - Solvent-based inks
 - Curable inks
 - Ink formulation components
 - Mixing and scale-up
- Substrates
 - Polymers, glass, paper, textiles and metals

15:00 - 15:30 Coffee break

Printing - Printed Electronics Limited

- Inkjet
- Screen print
- Other print technologies such as flexography, gravure etc.

17:00 Course ends

Speakers

Dr Neil Chilton, Technical Director

Printed Electronics Limited, UK

Neil has more than twenty years' experience in the field of electronics and electronic components. After completing his BSc and PhD in Physics, his technical career took him to Japan where he worked for four years at the advanced materials research division of Nippon Steel Corporation. After returning to the UK he joined Europe's then largest printed circuit board manufacturing company where he was later part of an MBO team and technical director. In 2006, together with co-founder Dr Steve Jones, he started Printed Electronics Limited to focus on the practical use of inkjet for manufacturing electronic interconnects, devices and systems.



Dr Clare Conboy, Formulation Chemist

Printed Electronics Limited, UK

Clare has more than 20 years' experience of formulating and characterising fluids for spray and printing applications. This includes many years of working with inkjet inks for piezo and thermal DOD printheads, initially for graphics and in recent years for materials deposition applications, including a diverse range of materials including metals, inorganics and adhesives in a range of solvent systems. Following completion of a PhD in Chemistry, she has worked for a number of organisations with a focus on inkjet technology, including Xaar and Plastic Logic. Clare has been involved with Printed Electronics Limited since its establishment.

