Measurement Facilities:
Organic Electronics Processing

The Polymers Division has established capabilities to support the lab-scale processing of organic conductors and semiconductors into films and circuits. These capabilities include oxygen- and water-free environments for sample fabrication, with a variety of film-forming and patterning methods including spin-coating, flow-coating, and inkjet printing. In addition, we have installed a robotic system for the automated electrical measurement of a large number of organic electronic devices. These facilities are used to study the influence of processing methods and variables on the development of organic semiconductor microstructure, and then determine the consequences on electrical performance. This paradigm provides robust guidelines, supported by fundamental measurements, to assist industrial process design.

Fabrication Facility

Our organic electronics fabrication facility has essential capabilities required to fabricate films and circuits of organic components without atmospheric contamination. The system consists of a dual glove box system serviced by a T-style antechamber, with an auxiliary third box, for a total of 4 gloved stations. Salient in-box features include:

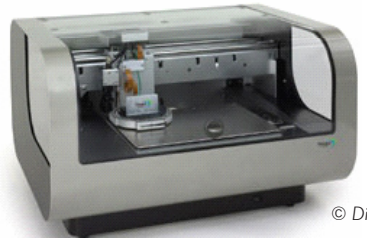
- Formulation with balance, dry solvents & heaters
- Spin-coating up to 6000 rpm
- Flow-coating, computer controlled
- Film drying, annealing, and packaging station
- Integrated thermal evaporator for metallization
- Oxygen and water levels maintained at < 3 ppm
- HEPA filters and solvent scrubbers

Glove box system in use

Printing

Inkjet printing has become widely used for organic circuit patterning. Our printing facility features:

- Droplet volume down to 1 pL
- Ability to tolerate aromatic solvents
- Machine vision for fiducial alignment
- Adjustable substrate temperature



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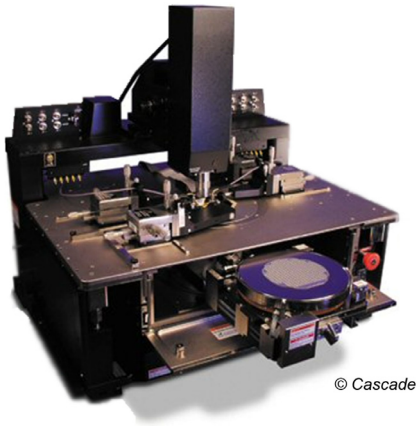
Organic electronics inkjet printer

Automated Electrical Measurement

Electrical testing of many devices is essential to evaluate statistical variations in performance. Our automated electrical measurement station features:

- Motorized 4-axis stage and 3-axis probes
- Motion and test equipment fully programmable
- Adjustable chuck temperature



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Automated device testing station

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FACILITIES