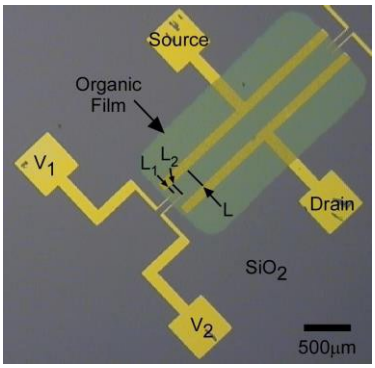
INDUSTRIAL PARTNERSHIP
FOR RESEARCH IN
INTERFACIAL AND MATERIALS ENGINEERING

Flexible Electronics and Photovoltaics Program

Charge transport along and across interfaces is central to the operation of all organic electronic and optoelectronic devices, including organic light-emitting diodes (OLEDs), field effect transistors (OFETs), and photovoltaic cells (OPVs). The efficiency of OLEDs, for example, relies on the transport of charge across multiple organic and metal-organic heterojunctions, as well as the confinement of molecular excited states at interfaces. Continued expansion of organic optoelectronics in displays, solid-state lighting, printed flexible electronics, sensing, photodetection, and solar energy conversion requires performance improvements in OLEDs, OFETs and OPVs, where interfacial properties dominate performance. *The goal of the Flexible Electronics and Photovoltaics (FEP) Program is: (1) to employ cutting-edge characterization methods to determine structure-property relationships at organic optoelectronic interfaces, and (2) to use this knowledge to prepare organic interfaces with improved performance in devices, particularly OFETs, OPVs, and electrically pumped organic lasers.* FEP faculty are also increasingly interested in developing methods to print active organic devices on flexible substrates. To achieve these goals we have assembled a student/faculty team with expertise spanning organic synthesis, film growth and processing, structure characterization, spectroscopy, charge transport, computation, device fabrication, and modeling.

The FEP program greatly expands the scope of organic electronic materials research at Minnesota. A principal distinction of the program is its focus on optical properties of organic semiconductors in addition to electronic properties. This is exemplified in the enhanced emphasis on spectroscopy embodied by Blank, Massari, and Zhu, and in the participation of Holmes, who brings expertise in OLEDs, lasers, and OPVs. This broader scope was implemented in response to the growing importance of optoelectronic devices in applications such as display, lighting, detection, and solar energy conversion. The FEP program is unique in the U.S. in its comprehensive approach to organic semiconductors research, combining broad expertise in materials synthesis, thin film characterization and devices with cutting-edge spectroscopy and theory. The interdisciplinary character will help researchers to uncover fundamental structure-property relationships, to improve materials synthesis and processing, and to develop new device paradigms as a result of its integration of diverse and complementary areas of expertise.



An organic thin film transistor

Principal Investigators and their primary areas of expertise:

Russell Holmes, **Program Leader**	OLEDs, Solar Cells, Thin Film Growth
David Blank	Ultrafast Optical Spectroscopy
Chris Douglas	Organic Synthesis
C. Daniel Frisbie	Organic Electonics, OFETs, AFM
Paul Ruden	Device Modeling

Contact: To learn more about the Flexible Electronics and Photovoltaics program & IPRIME, contact Bob Lewis, Director of Technology Transfer, at 612-625-1269 or boblewis@umn.edu, and visit the IPRIME website www.iprime.umn.edu.

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