Materials Chemistry Seminar

Friday, November 17, 2023
11:30 a.m. ~ BRWN 4102

"Making Printable Mechanically Agile Electronics and Opto-Electronics a Reality. Electroactive Polymers and Amorphous Oxides"

Professor Tobin J. Marks

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Abstract:

This lecture focuses on the challenging, understanding-based design, creation, and realization of new materials combinations for unconventional, flexible/bendable/stretchable electronic circuitry. Fabrication methodologies include high-throughput, large-area, high-resolution printing techniques. Materials design issues for next-generation photovoltaics build upon the above findings and include: 1. Designing mechanical agility into semiconducting organic electronics, 2. Designing electron/hole and ion conduction into organic electronics 3. Hybridizing organic and oxide electronics. In all areas, the symbiosis of green materials synthesis, computational modeling and simulation, and materials characterization over multiple length scales are central to progress.

Biosketch: Tobin Marks received a Chemistry BS from the U. of Maryland, and a Chemistry PhD from MIT. Recognitions include the U.S. National Medal of Science, Spanish Principe de Asturias Prize, MRS Von Hippel Award, Dreyfus Prize in the Chemical Sciences, NAS Award in Chemical Sciences, ACS Joseph Priestley Medal, the Israel Harvey Prize, and the German Chemical Society Karl Ziegler Prize. He is a member of the U.S., German, Italian, European, and Indian National Academies of Sciences, U.S. National Academy of Engineering, American Academy of Arts and Sciences, American Philosophical Society, and the U.S. National Academy of Inventors. Fellow: U.K. Royal Society of Chemistry, MRS, ACS, Chinese Chemical Society, and Israel Chemical Society. He has published 1500 peer-reviewed articles and holds 208 issued U.S. patents. Honorary Doctorate Degrees: Hong Kong U. of Science and Technology, U. of South Carolina, Ohio State U., and Technical U. of Munich.

Two representative publications:

1. Chen, J.; Huang, W.; Zheng, D.; Xie, Z.; Zhuang, X.; Zhao, D.; Chen Y.; Su, N.; Chen, H.; Pankow, R.M; Gao, Z.; Yu, J.; Guo, X.; Cheng, Y.; Strzalka, J.; Yu, X.; Marks, T.J.; Facchetti, A.; Highly Stretchable Organic Electrochemical Transistors with Strain-Resistant Performance, Nature Materials, 2022, 21, 564–571. DOI:10.1038/s41563-022-01239-
2. Zhang, X.; Wang, B.; Huang, L.; Huang,W.; Zhu, W.; Wang, Z.; Chen, Y.; Facchetti, A.; Marks, T.J.; Breath Figure-Derived Porous Semiconducting Films for Organic Electronics, Science Advances, 2020, 6, eaaz1042. DOI: 10.1126/sciadv.aaz1042.

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