CLEAN ENERGY INSTITUTE
UNIVERSITY of WASHINGTON

SPECIAL SEMINAR DATE AND LOCATION

Interdisciplinary Seminar Series Lecture:
Interface Science of Organic Photovoltaics

The ability to fabricate molecularly tailored interfaces with nanoscale precision offers means to selectively modulate charge transport, molecular assembly, and exciton dynamics at hard matter-soft matter and soft-soft matter interfaces. Such interfaces can facilitate transport of the "correct charges" while blocking transport of the "incorrect charges" at the electrode-active layer interfaces of organic photovoltaic cells. This interfacial tailoring can also suppress carrier-trapping defect densities at interfaces and stabilize them with respect to physical/thermal de-cohesion. For soft matter-soft matter interfaces, interfacial tailoring can also facilitate exciton scission and photocurrent generation in such cells. In this lecture, challenges and opportunities in organic photovoltaic interface science are illustrated for four specific and interrelated areas of research: 1) controlling charge transport across hard matter(electrode)-soft matter interfaces in organic photovoltaic cells, 2) controlling charge transport by specific active layer orientational organization at electrodes, 3) controlling exciton dynamics and carrier generation at donor-acceptor interfaces in the active layer, 4) designing transparent conducting electrodes with improved properties. It will be seen that such rational interface engineering along with improved bulk-heterojunction polymer structures guided by theoretical/computational analysis affords exceptional fill factors, solar power conversion efficiencies greater than 9%, and enhanced cell durability.

Tuesday May 13
4:00 – 5:00 PM
Kane Hall 110

Reception will take place at 3:30 p.m. in Kane Hall lobby prior to start of lecture

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Tobin Marks is Vladimir N. Ipatieff Professor of Chemistry and Professor of Materials Science and Engineering at Northwestern University, and Distinguished Adjunct Professor at Texas A&M Qatar and at Korea University. He received a B.S. degree in Chemistry from the University of Maryland (1966) and Ph.D. from MIT (1971) in Inorganic Chemistry. His research interests include transition metal and f element organometallic chemistry; catalysis; vibra¬tional spectroscopy; nuclear magnetic resonance; synthetic facsimiles of metallo¬protein active sites; carcinostatic metal complexes; solid state chemistry and low-dimensional molecular metals; nonlinear optical materials; polymer chemistry; tetrahydroborate coordination chemistry; macrocycle coordination chemistry; laser-induced chemistry and isotope separation; molecular electro-optics; metal-organic chemical vapor deposition; polymerization catalysis; printed flexible electronics; solar energy; and transparent conductors.