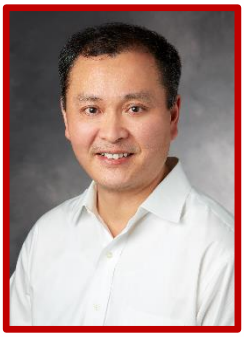
CHEMISTRY

FALL 2017 CHEMISTRY COLLOQUIA, COSPONSORED BY NCMN



November 3, 2017

3:00 p.m. Reception
548 Hamilton Hall

3:30 p.m. Seminar
112 Hamilton Hall

Open to the public

WASHBURN AWARD LECTURE

Professor Hongjie Dai
Stanford University

Carbon Based Nanosciences

This talk will review our work on nanosciences based on carbon. I will first briefly review our earlier work of carbon nanomaterials including carbon nanotubes and graphene nanoribbons, and then focus on fluorescence imaging in the previously unexplored 1000-1700 nm NIR-II window to benefit from greatly suppressed photon scattering at long wavelengths. We show that NIR-II imaging is novel with up to ~ 4 mm tissue depth capable of sub-10 micron spatial resolution, using a wide range of fluorescent agents including carbon nanotubes, AgS_2 quantum dots, donor-acceptor conjugated polymers and small organic molecules emitting in the 1000-1700nm range.

The second part of the talk will focus on our work on advancing new types of electrocatalysts for renewable catalyst applications and the development of novel batteries. I will talk about achieving record setting performance of electrocatalysts for water splitting including HER and OER. We have developed a novel Ni/NiO heterostructured hydrogen evolution reaction (HER) catalyst and a NiFe layered double hydroxide (NiFe LDH) oxygen evolution reaction (OER) catalyst to enable water splitting using a record low voltage of < 1.5 volt, making it possible to make an electrolyzer for hydrogen and oxygen gas generation running on a single AAA alkaline battery cell. I will also present our recent work on the development of rechargeable Al ion battery utilizing some of the most abundant materials on earth.

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