A wide range of chemical processes proceed by proton-coupled electron transfer (PCET), from combustion to water oxidation to the redox dissolution of minerals. This presentation will begin with fundamental studies of single reaction steps that involve transfer of one proton and one electron. Some of these reactions ‘look like’ hydrogen atom transfers, such as oxyl radicals abstracting H• from vitamin C, while in other reactions the electron and proton are quite separated in the reactants or products. The rate constants for many of these reactions can be understood using a version of Marcus Theory, and this shows the commonality of organic and transition metal H-atom transfer reactions.

PCET concepts are also being used in the development of new water-oxidation and oxygen-reduction electrocatalysts, and to develop the redox reactivity of oxide nanoparticles. For instance, reduced and protonated ZnO and TiO₂ nanoparticles will transfer e⁻ and H⁺ (H•) to nitroxy1 and phenoxy1 radicals.

Refreshments will be served at 11:30 am