



Recent Developments in Transfers of Electrons and other Transfers

Rudolph A. Marcus

Noyes Laboratory of Chemical Physics
California Institute of Technology
Pasadena CA 91125 USA

Abstract

In recent years experiments have been made on ultrafast electron transfers with reaction times ~ 100 fs or somewhat less and we discuss some of these results. In these short times solvent dynamics plays essentially no role in the reaction rate and vibrational effects are expected to be dominant. There are “electron transfer active vibrations” and “electron transfer inactive vibrations” at these short times, though the data thus far are relatively sparse. We discuss an approximate theory for such systems which are expected to be “electronically adiabatic” and so independent of the coupling strength when it is sufficiently large.¹ This independence differs from that which arises when the solvent dynamics is so slow that it rather than the electron transfer becomes rate-controlling.

A quite different topic, which we comment on if time permits, is how one can adapt the electron transfer formalism to other types of transfers, such as group transfers in enzymes, and in this way apply the ET formalism to single molecule studies of biomolecular machines.²

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1. R.A. Marcus and M.E. Michel-Beyerle, manuscript in preparation
 2. Some of our current findings on a rotary motor F_1 ATPase, in collaboration with Dr. S. Volkan-Kacso, are described in *Quarterly Reviews of Biophysics*, **50**, 2017, no. 14, 1-13.