unicat
Unifying Concepts in Catalysis

UniCat Colloquium

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Electronic Conduction and Electron Transfer across Proteins

Electron transport (ETp), i.e., conduction, through proteins in a solid state–like configuration is remarkably efficient, given the several nm transport distances involved and the absence of continuous ?-bonded pathways through the proteins. As some proteins have a natural electron transfer (ET) function we ask how ET and ETp are related. To regulate ET nature uses redox chemistry. The resulting control over the process, is achieved even at the expense of free energy, low rates and ubiquity.
In solid-state electronics electron transport is controlled normally by gating via a 3rd electrode. Indeed, also in proteins, such transport does not require a redox process. Even if hopping is involved, the residence time of the charge carrier on the hopping site is too short to allow full nuclear relaxation although redox-activity can be included if transport rates are slow enough, naturally, or by slowing it down purposely.
Experimental data on ETp via proteins show poor fits with current ET models (pathway or average packing density), such as lack of distance dependence, which may result from the above-noted difference. Still, it will be remarkable if ET and ETp mechanisms and pathways in proteins turn out to be unrelated. Irrespective of this, understanding solid-state like ETp charge transport pathways should help to advance bioelectronics.
See also our progress report (Amdursky et al.) to be out shortly in Adv. Mater. (2014)

Friday, November 14, 2014 at 10:00 AM
PC 305

Prof. Hildebrandt (TUB)
Organizer

Coffee and cake will be served 30 minutes before the lecture. Guests are cordially invited to attend!
Prof. Dr. Matthias Driess - Chair of the Cluster of Excellence UniCat - www.unicat.tu-berlin.de