



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA



Nelson Mandela
Metropolitan
University
for tomorrow

UNIVERSITY OF THE
FREE STATE
UNIVERSITEIT VAN DIE
VRYSTAAT
YUNIBESITHI YA
FREISTATA



UFS·UV
NATURAL AND
AGRICULTURAL SCIENCES
NATUUR- EN
LANDBOUWETENSKAPPE

Contribution ID: 100

Type: Oral Presentations

Proteins as opto-electronic materials?

Wednesday, 6 May 2015 09:40 (30 minutes)

We have shown that electron transport (ETp), i.e., conduction, through protein monolayers in a solid state-like configuration is remarkably efficient, compared to most molecules, including conjugated ones.¹ Some proteins also have a natural electron transfer (ET) function and ET and ETp are related, but while nature regulates ET via redox chemistry, where control over the process is achieved even at the expense of free energy and low rates (and ubiquity), in ETp no redox process is needed. This allows study of optically active, no-redox proteins, such as the rhodopsins. We studied ETp in the dark and under illumination, esp. in bacteriorhodopsin, but also in halorhodopsin and the light-oxygen-voltage (LOV) sensing domain proteins. The experimental data on ETp via proteins show poor fits with current ET models (pathway or average packing density), such as lack of distance dependence. We will discuss progress towards understanding solid-state ETp charge transport, which will help to advance bio-opto-electronics.

¹ N. Amdursky et al., Adv. Mater. 42,7142-7161 (2014) Electronic Transport via Proteins 10.1002/adma.201402304 (progress report).

Are you currently a postgraduate student? (Yes/No)

No

Primary author: Prof. CAHEN, David (Weizmann Inst. of Science)

Presenter: Prof. CAHEN, David (Weizmann Inst. of Science)

Session Classification: Plenary

Track Classification: SACPM