# Electrospinning for building 3D structured photoactive biohybrid electrodes

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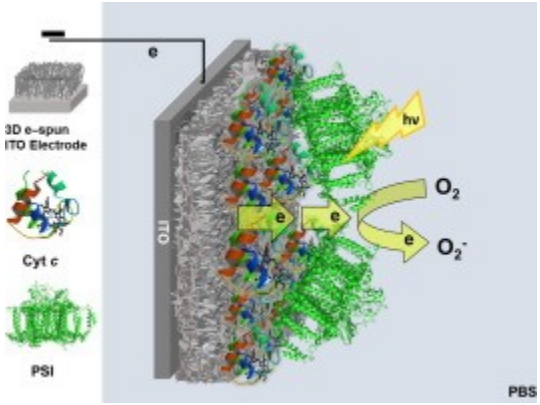
## Abstract

We describe the development of biohybrid electrodes constructed via combination of electrospun (e-spun) 3D indium tin oxide (ITO) with the trimeric supercomplex photosystem I and the small electrochemically active protein cytochrome *c* (cyt c). The developed 3D surface of ITO has been created by electrospinning of a mixture of polyelthylene oxide (PEO) and ITO nanoparticles onto ITO glass slides followed by a subsequent elimination of PEO by sintering the composite. Whereas the photosystem I alone shows only small photocurrents at

these 3D electrodes, the co-immobilization of cyt c to the e-spun 3D ITO results in well-defined photoelectrochemical signals.

The scaling of thickness of the 3D ITO layers by controlling the time (10 min and 60 min) of electrospinning results in enhancement of the photocurrent. Several performance parameters of the electrode have been analyzed for different illumination intensities.