



Materials Chemistry

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<http://materialschemistry.utu.fi/>

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Materials?

- Materials for energy conversion, transfer and storing
- Electronically conducting material
- Photoactive materials
- Electrocatalysts
- Composites



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Circulating Carbon



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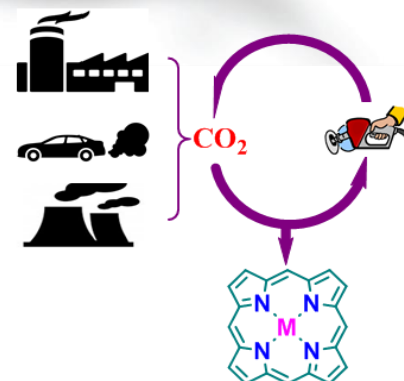
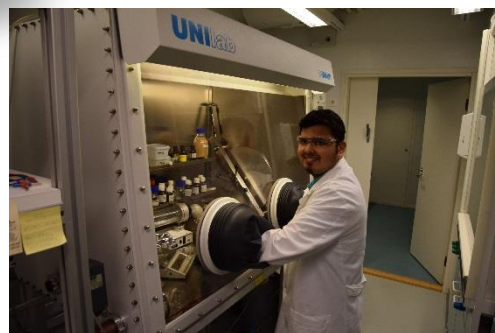
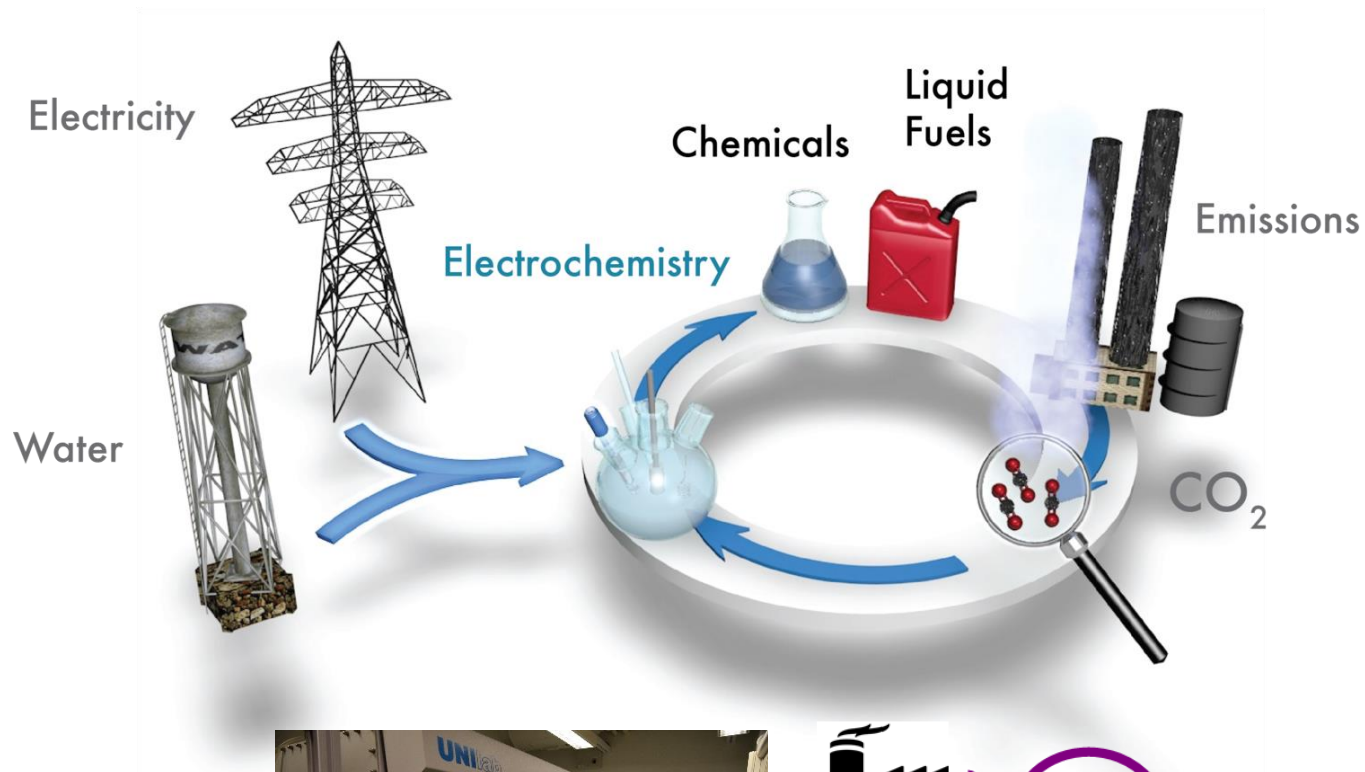
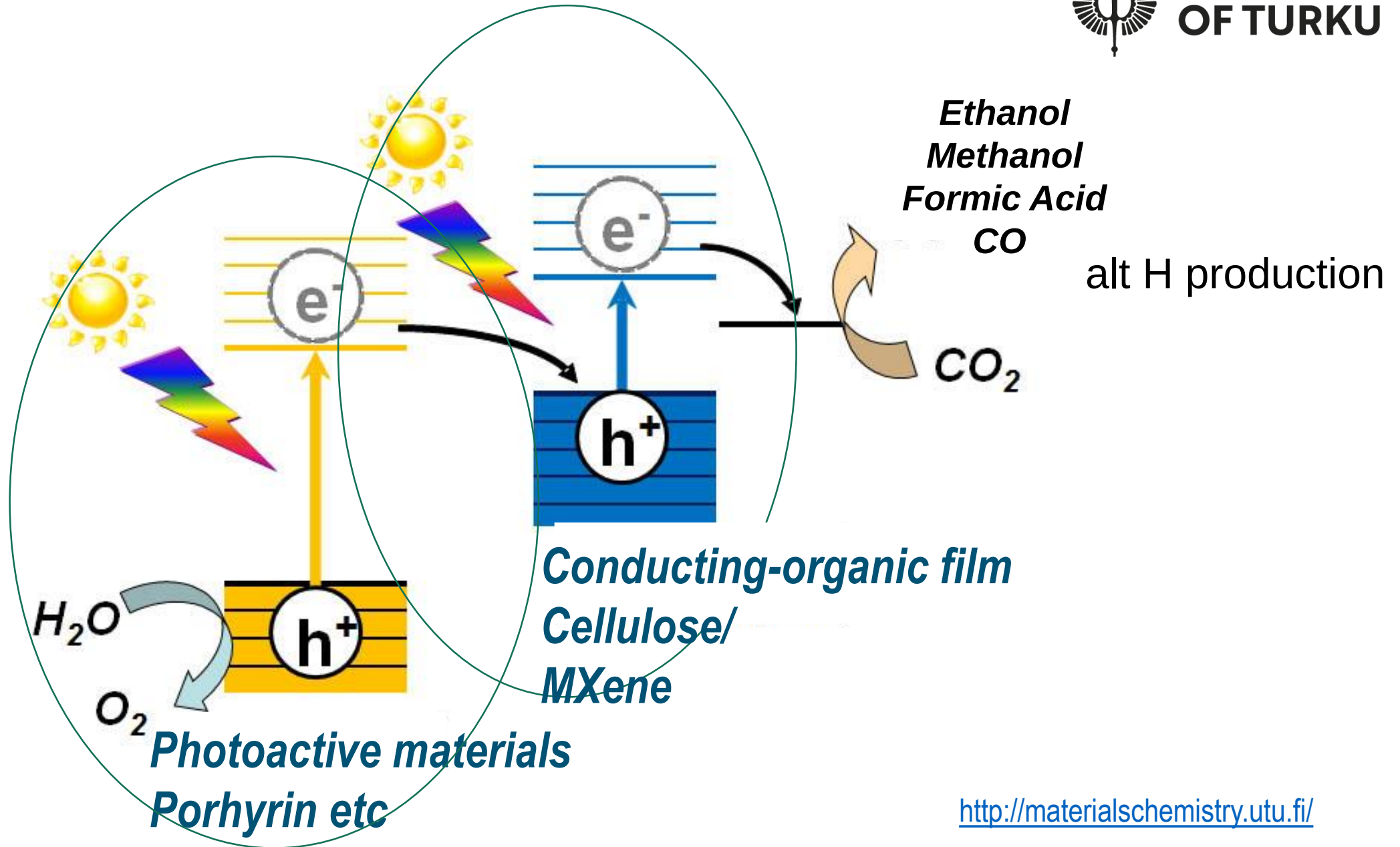


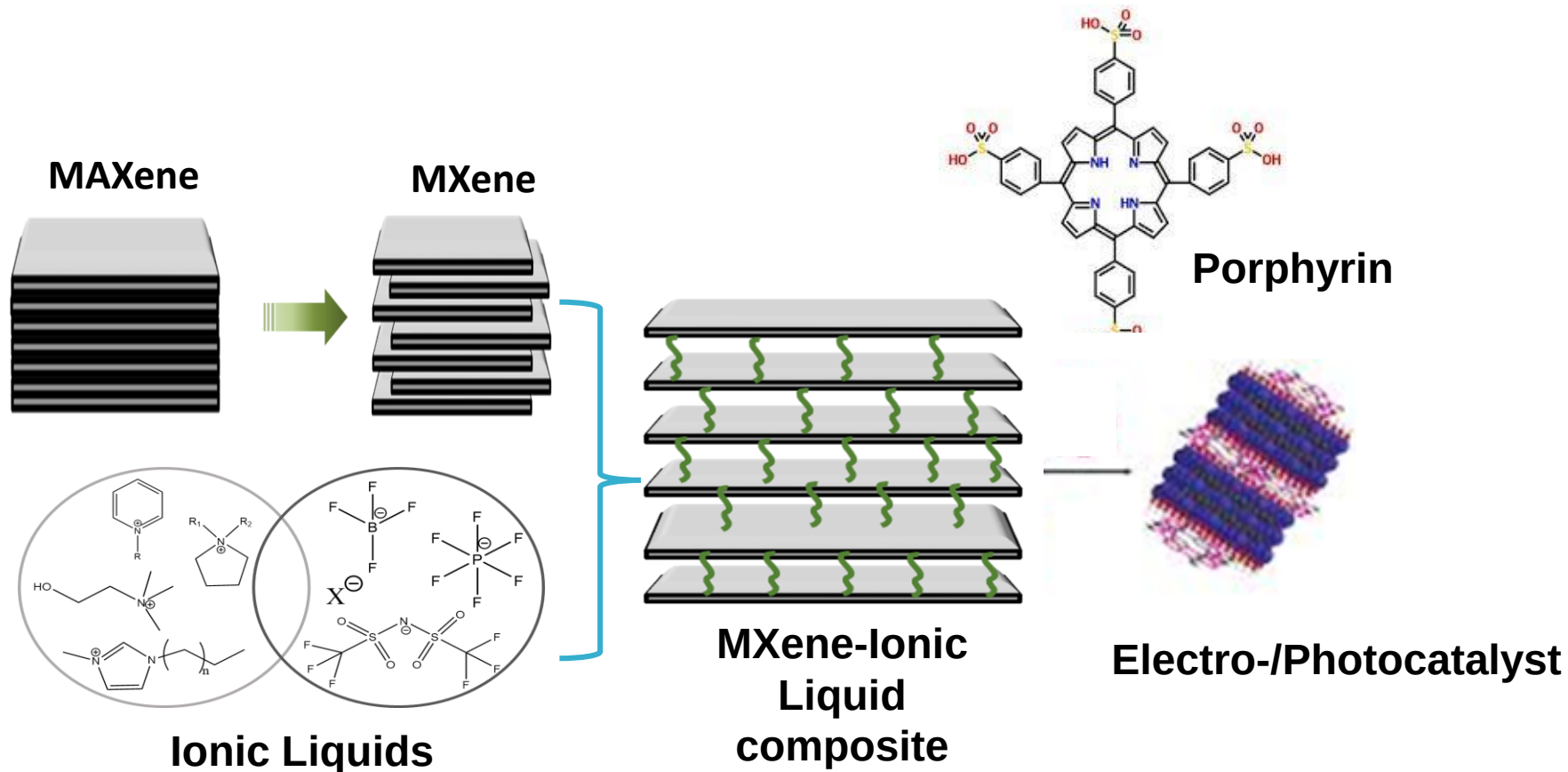
Photo & Electrocatalytic conversion of CO₂



Photo- electrochemical reduction/oxidation

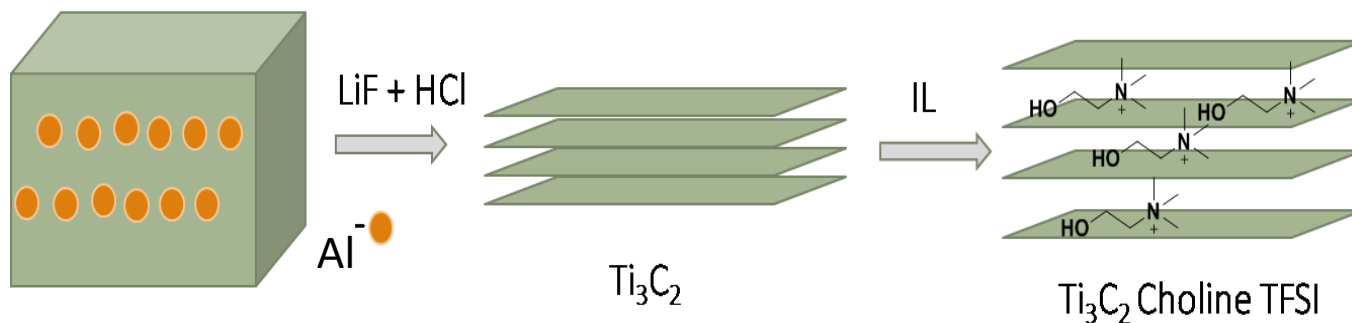


Synthesis of photo/electroactive catalysts for CO₂



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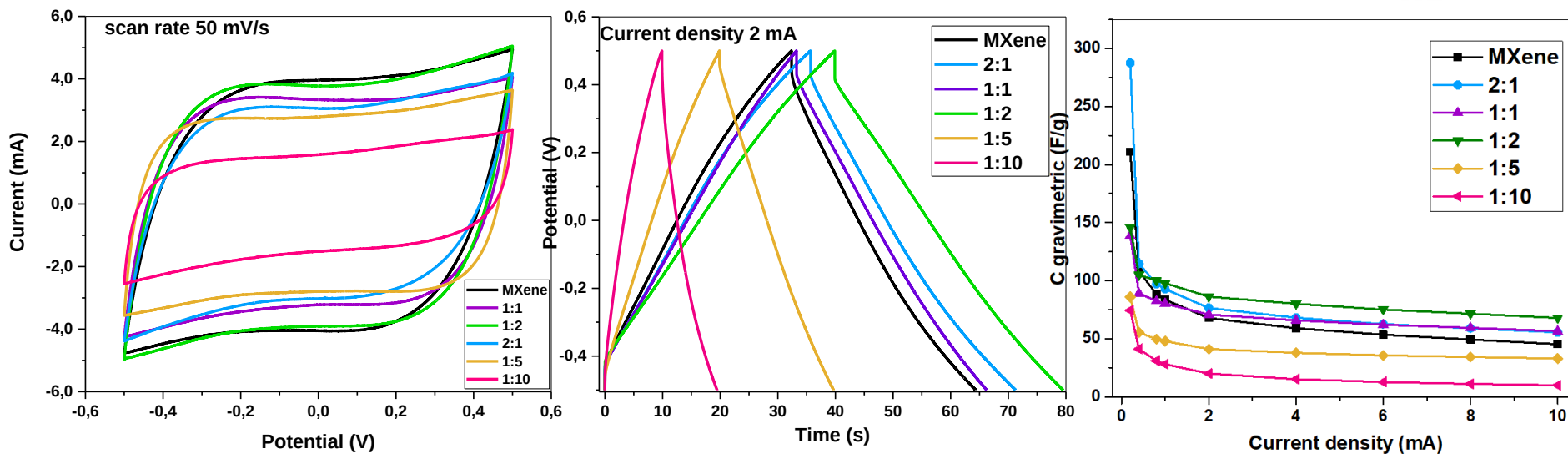


- ☐ Layered 2D materials synthesized from MAX phase
- ☐ Good electric, mechanic and optical properties
- ☐ Multiple possible applications

- ☐ Stable
- ☐ Non-volatile
- ☐ Ionically conductive
- ☐ Environmentally friendly



Flexible Supercapacitors



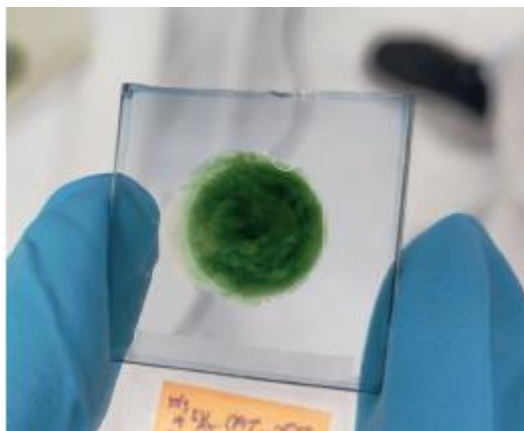


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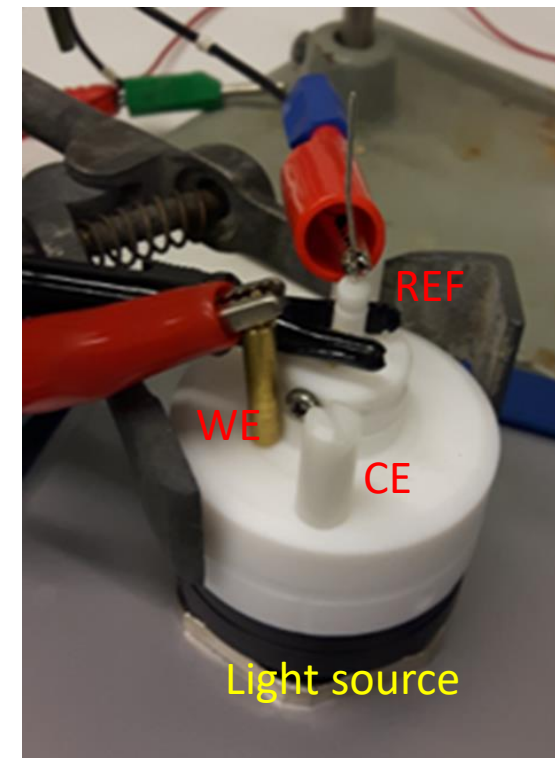
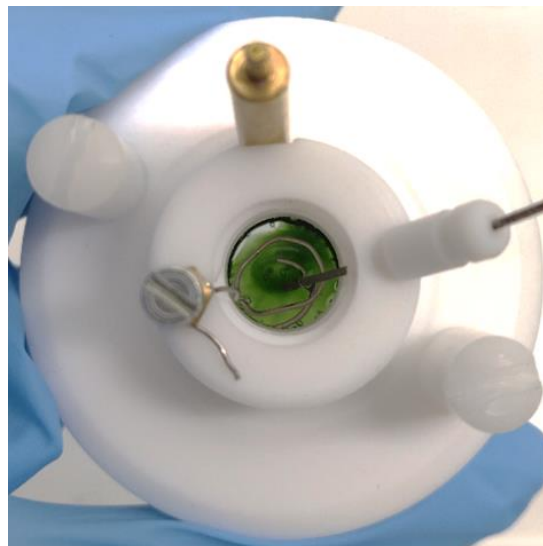
Biophotovoltaics (BPVs)



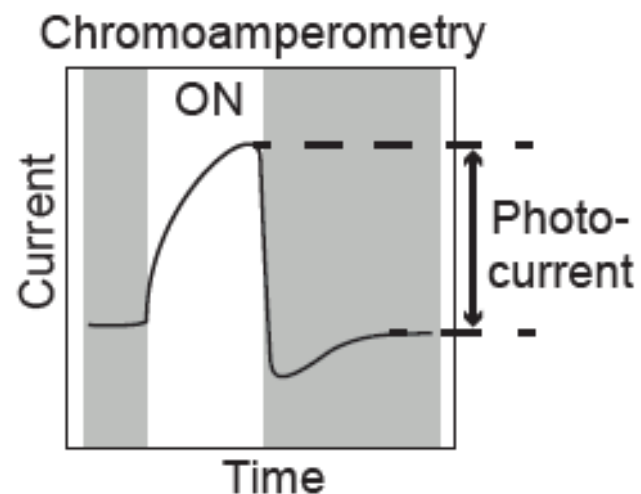
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AP-VPP PEDOT on glass
loaded with cyanobacterial cells



Photosynthetic efficiency of cells measured
in three-electrode photoelectrochemical cell



Photocurrent outputs measured during dark/light cycles



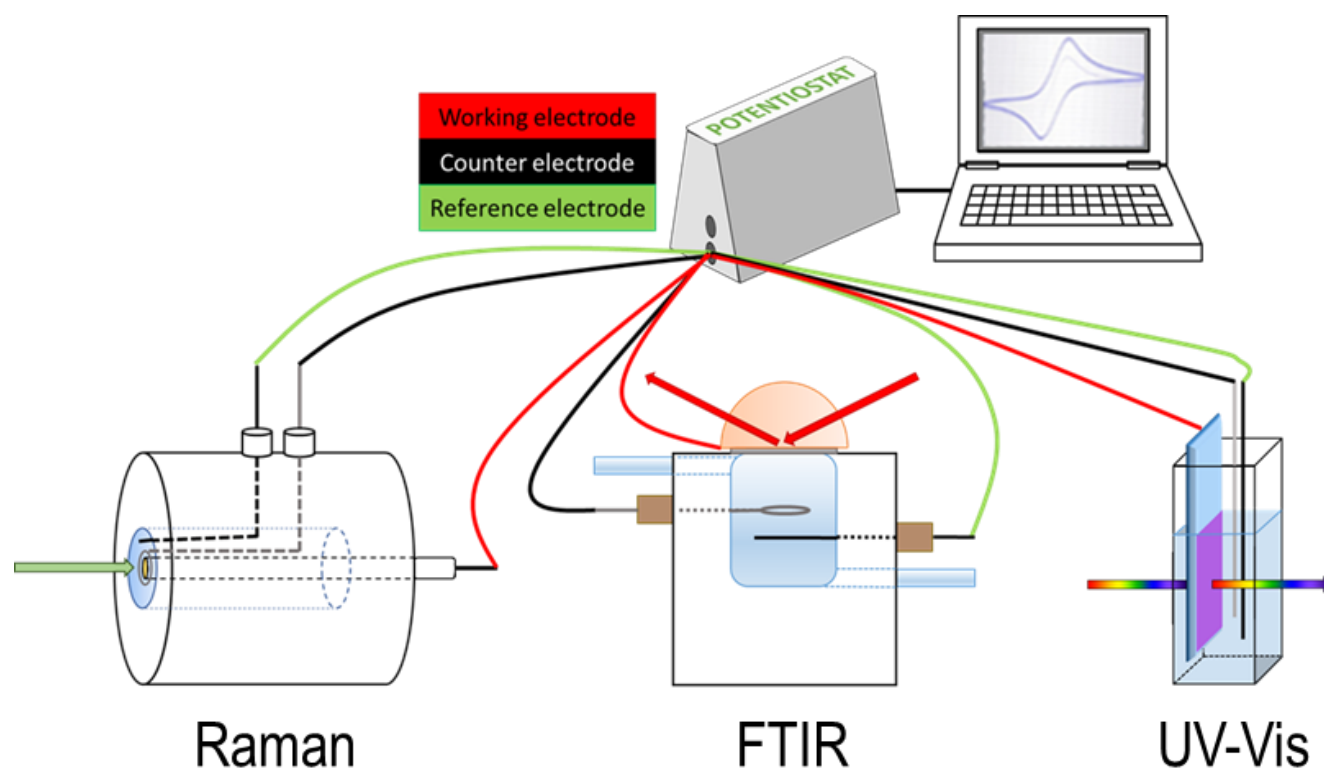
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Characterization techniques



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1) Studying the electronic transport with various *in situ* spectroelectrochemical techniques



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