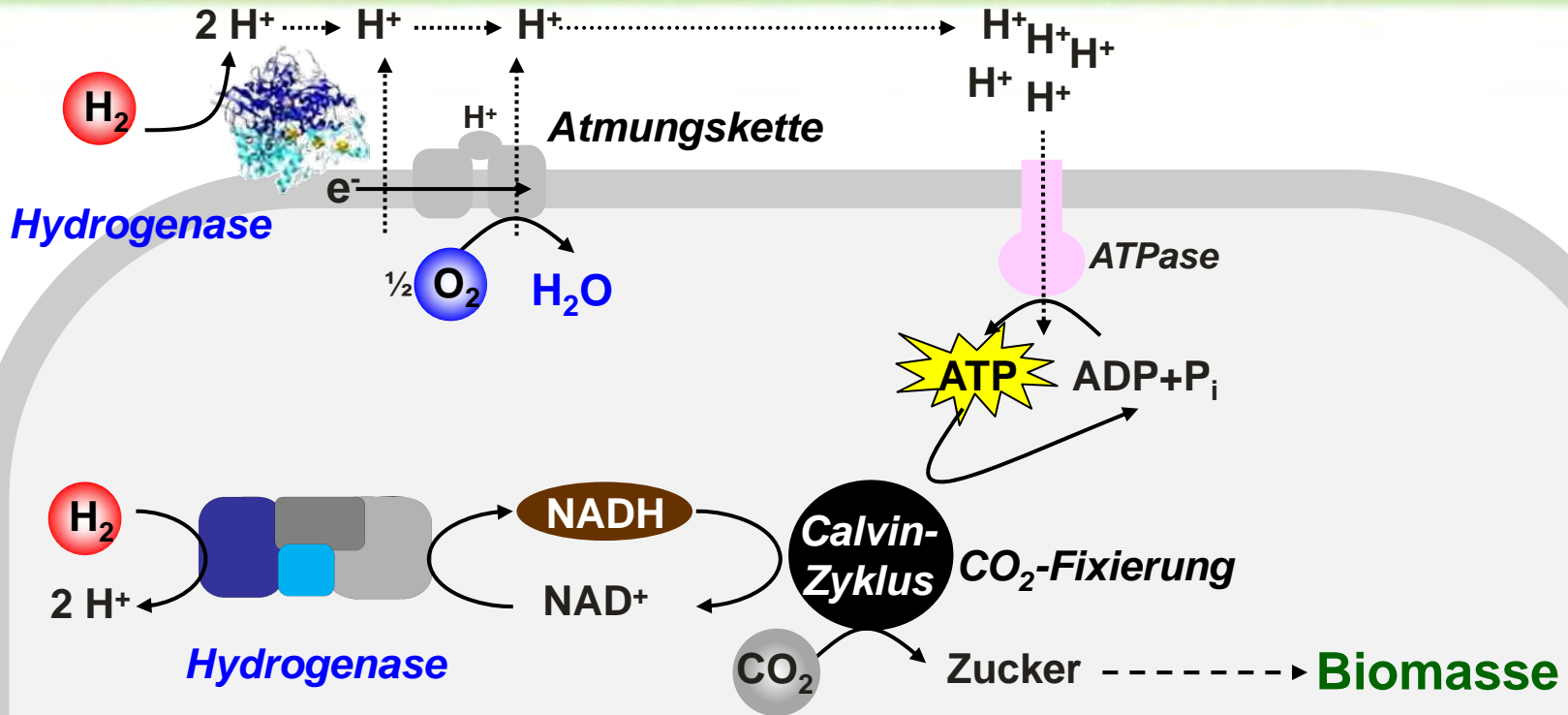
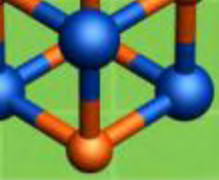
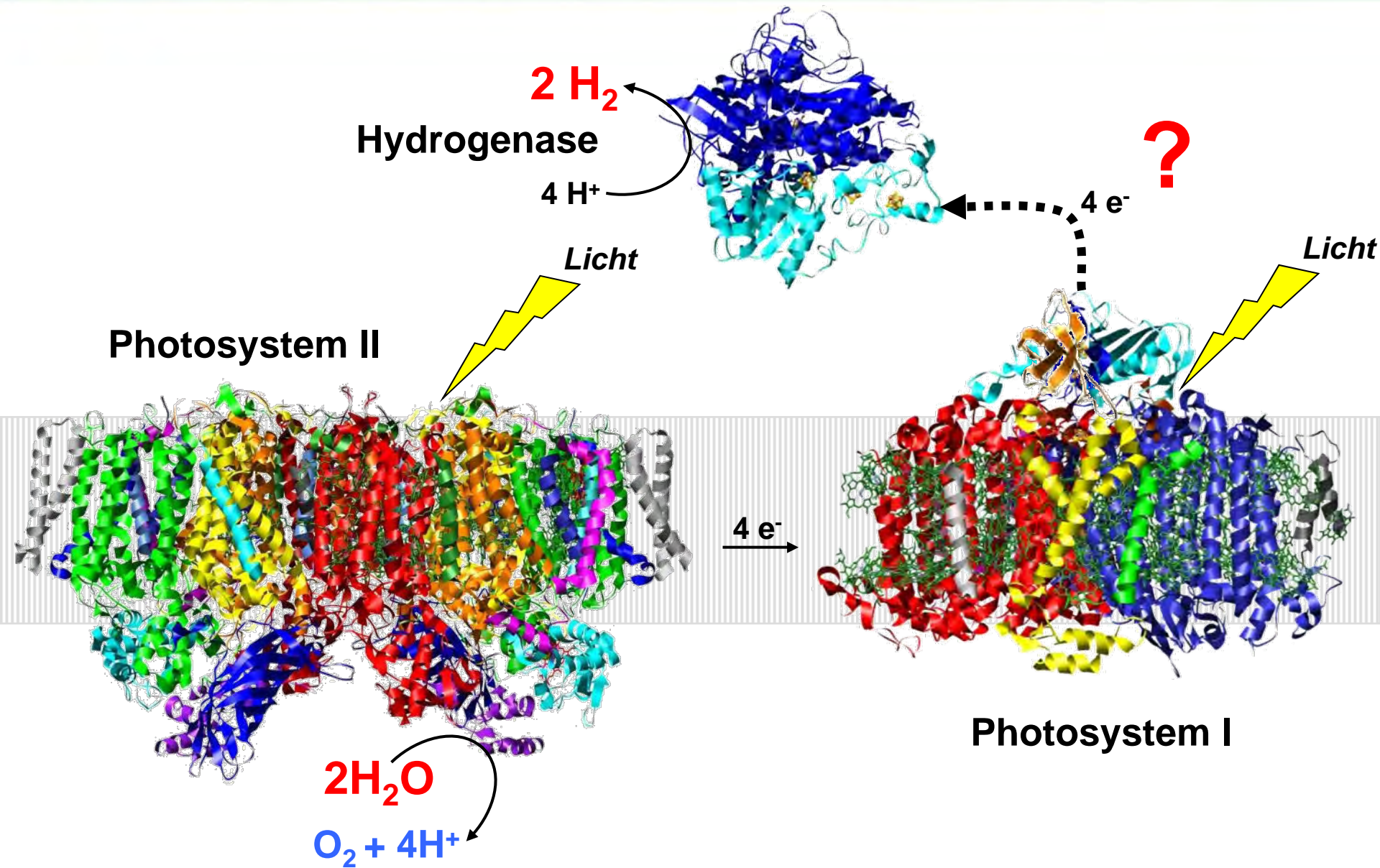


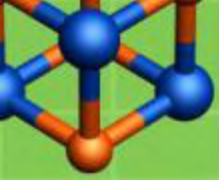
Leben mit explosiven Gasmischungen





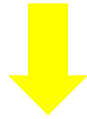
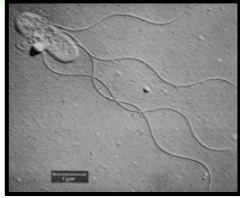
Kopplung von Photosynthese und Hydrogenase ?





Anreicherung der Komponenten

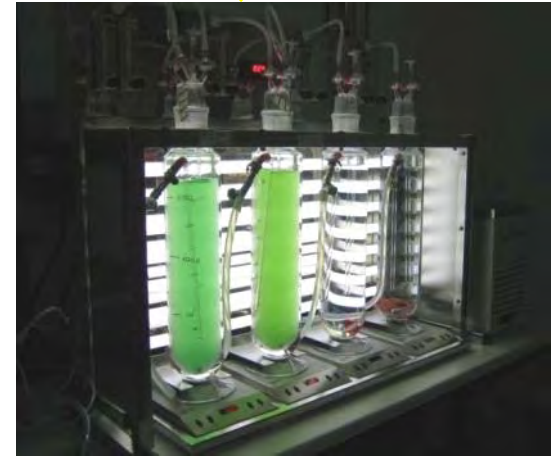
Ralstonia



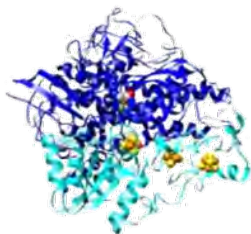
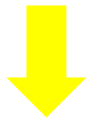
**Rekombinante
Zellen**



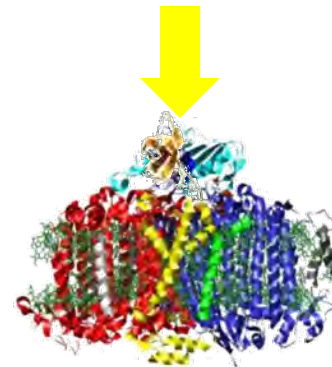
Synechocystis

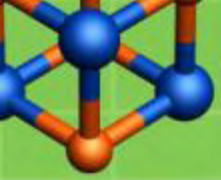


**Massen-
kultivierung
(Fermentation)**



Reinigung



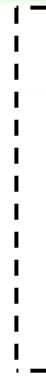


Kopplung von Photosynthese und Hydrogenase

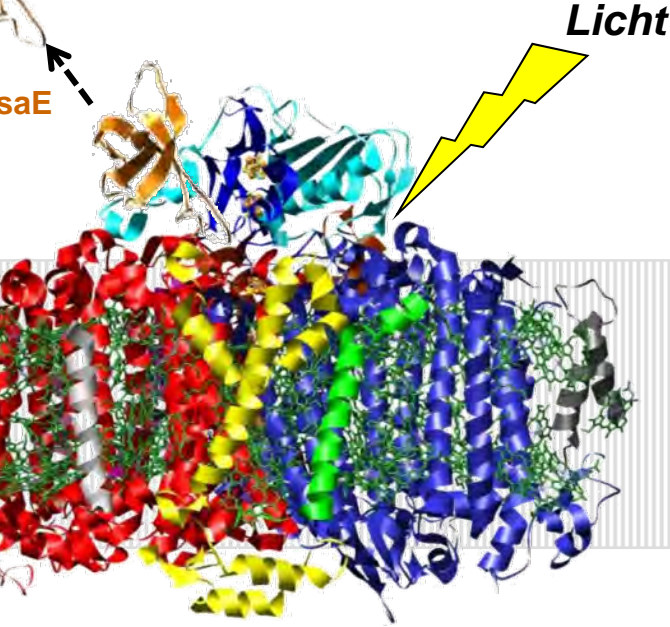


in vitro

Hydrogenase

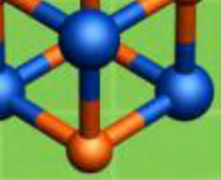


PsaE



Cytoplasma-Membran

Photosystem I

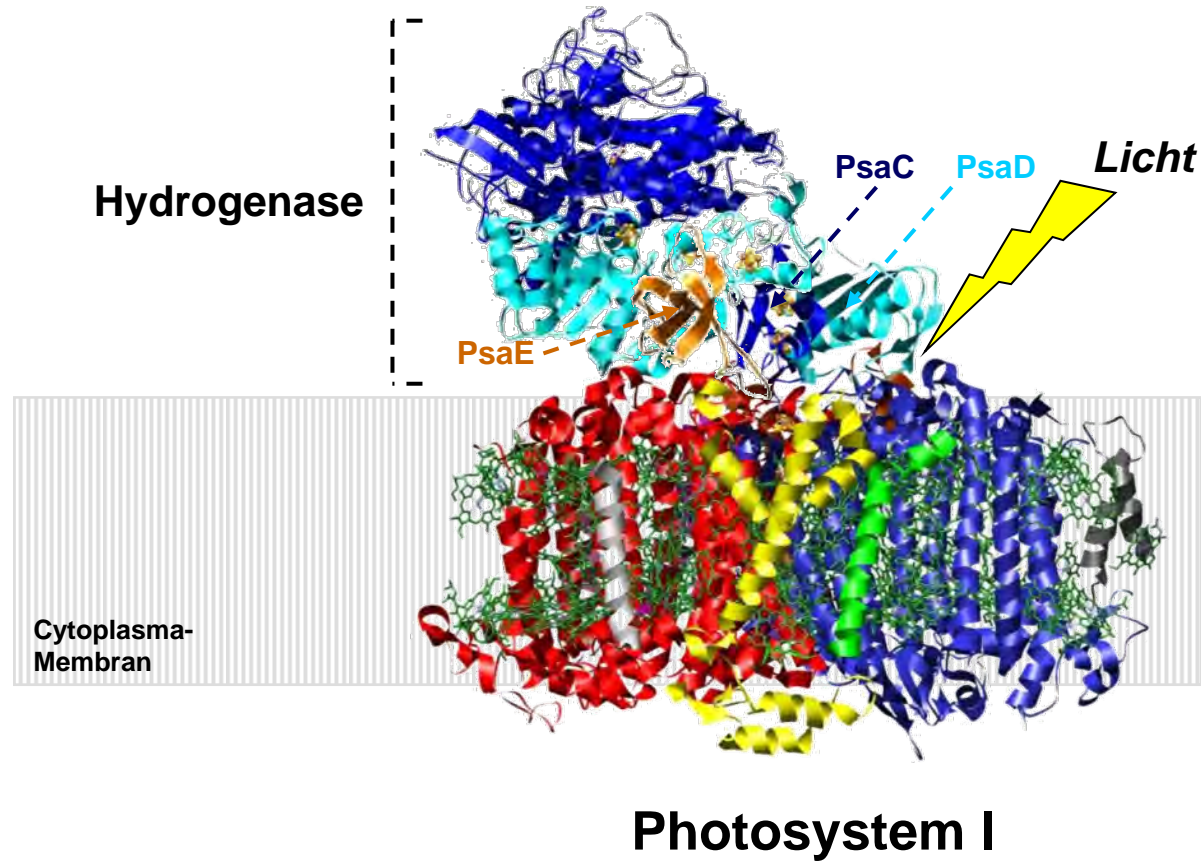


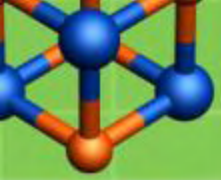
Kopplung von Photosynthese und Hydrogenase



in vitro

**Fusionsprotein aus
Photosystem I und
Hydrogenase**



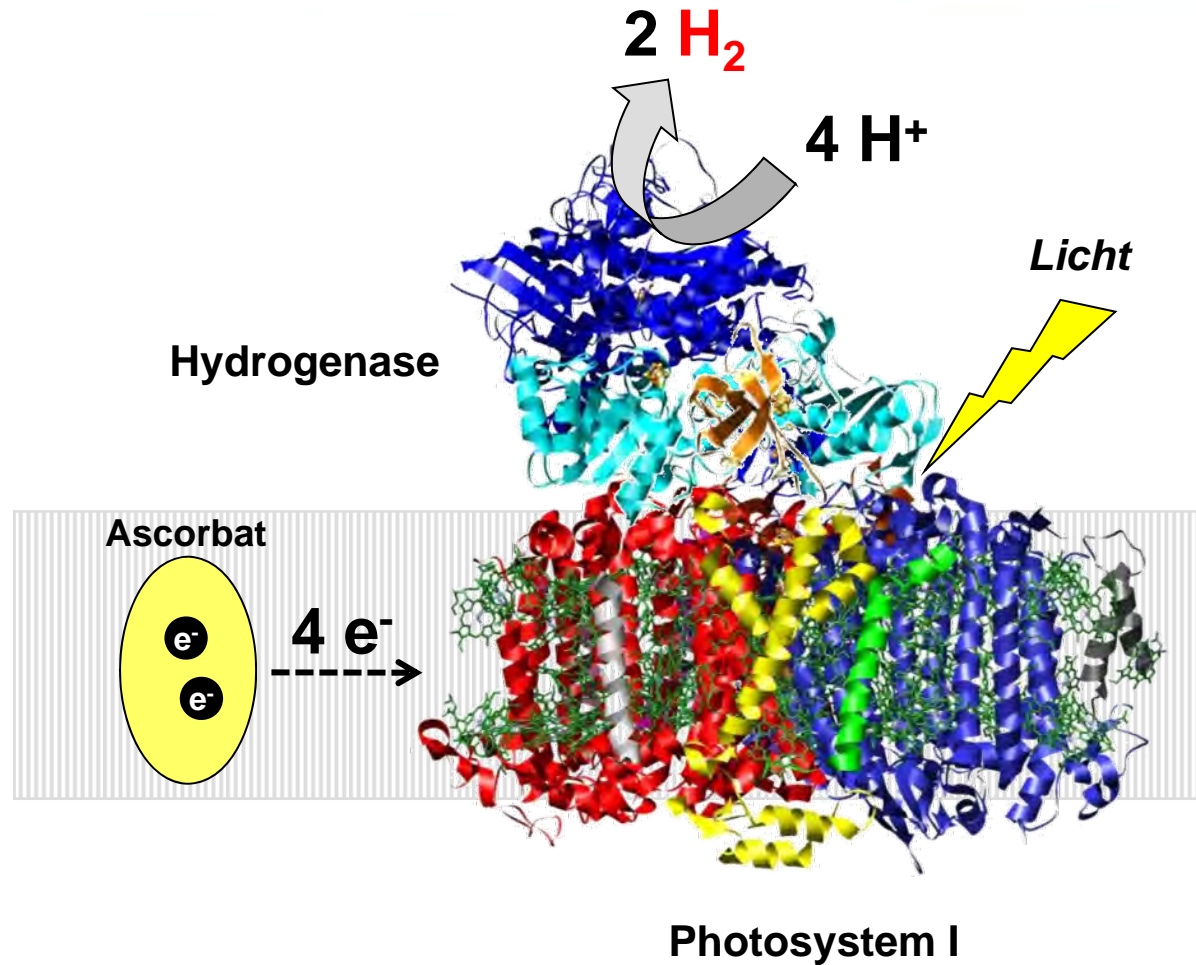


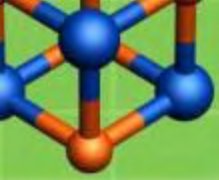
Lichtgetriebene Wasserstoffproduktion



in vitro

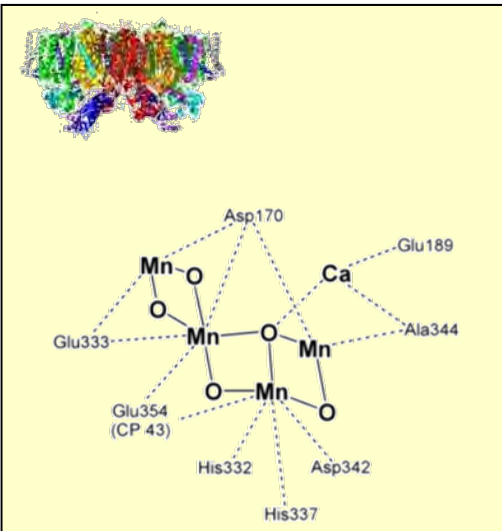
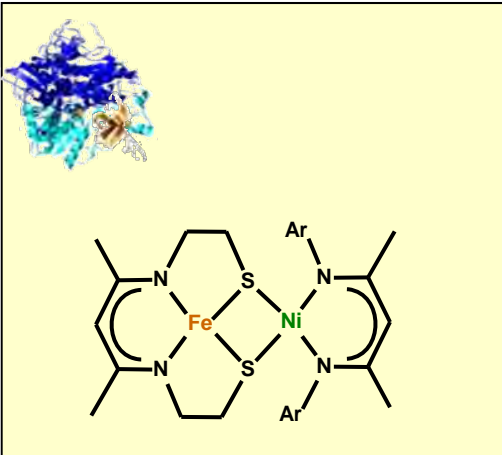
Umsatzrate:
75 Moleküle H₂
pro Sekunde
und
PSI-Hydrogenase-
Hybrid



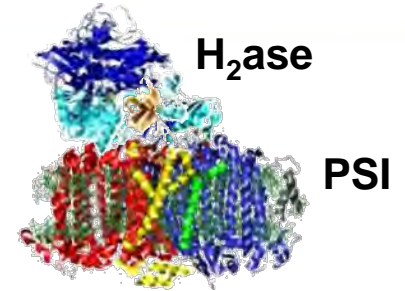
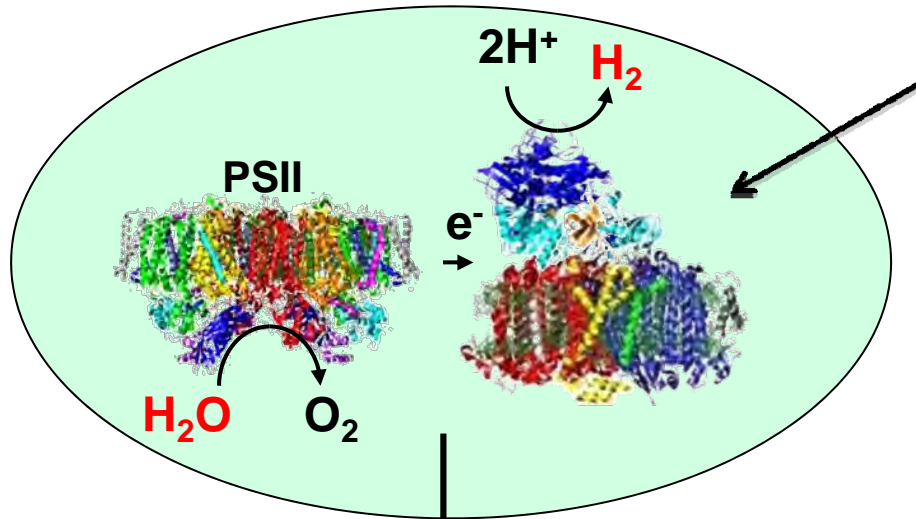


Bio-H₂: Die nächsten Schritte

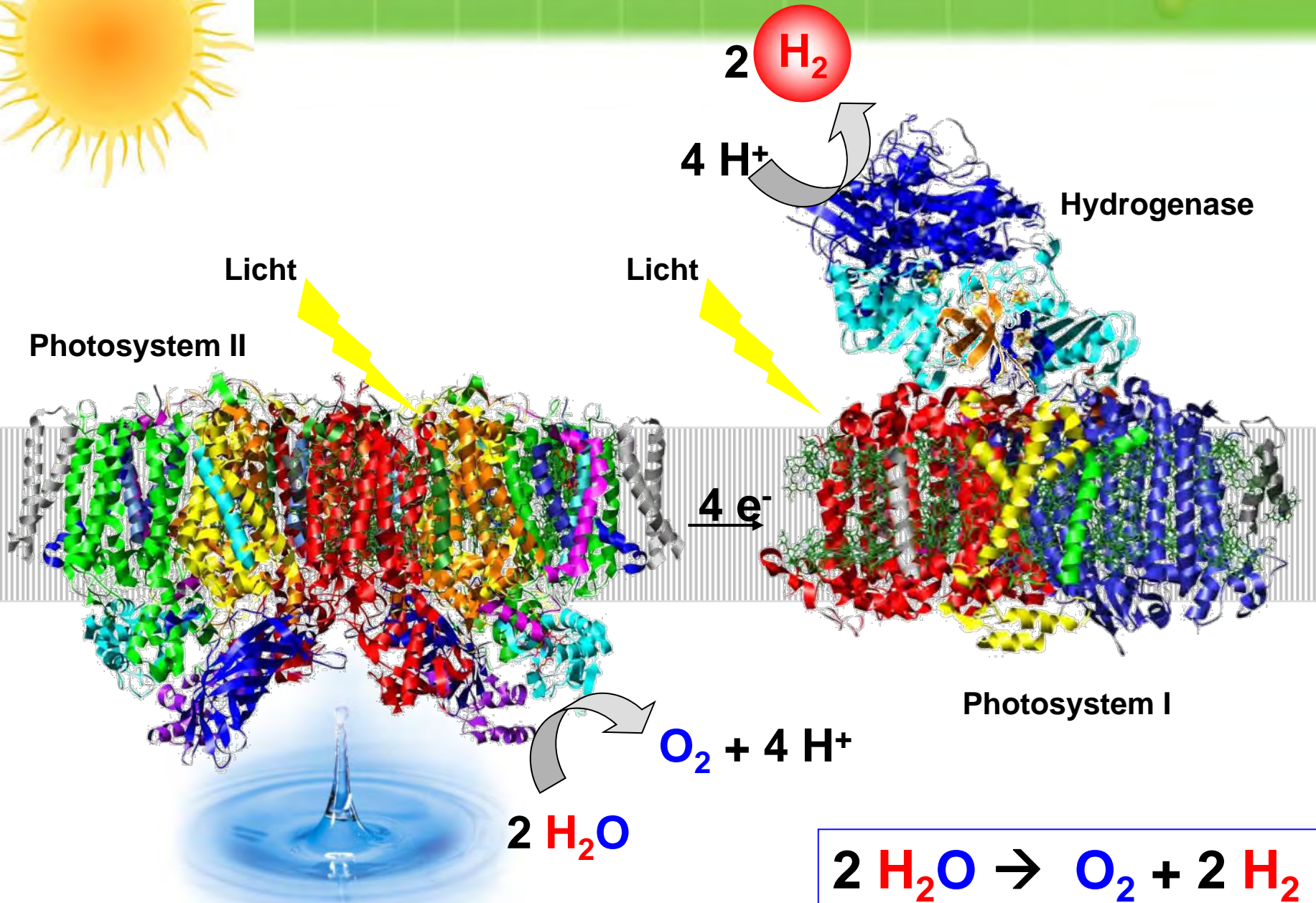
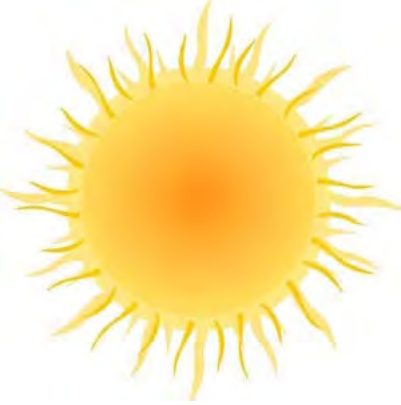
Katalytische Modellverbindungen

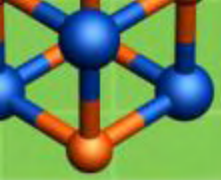


Synthetische H₂-produzierende Mikroorganismen

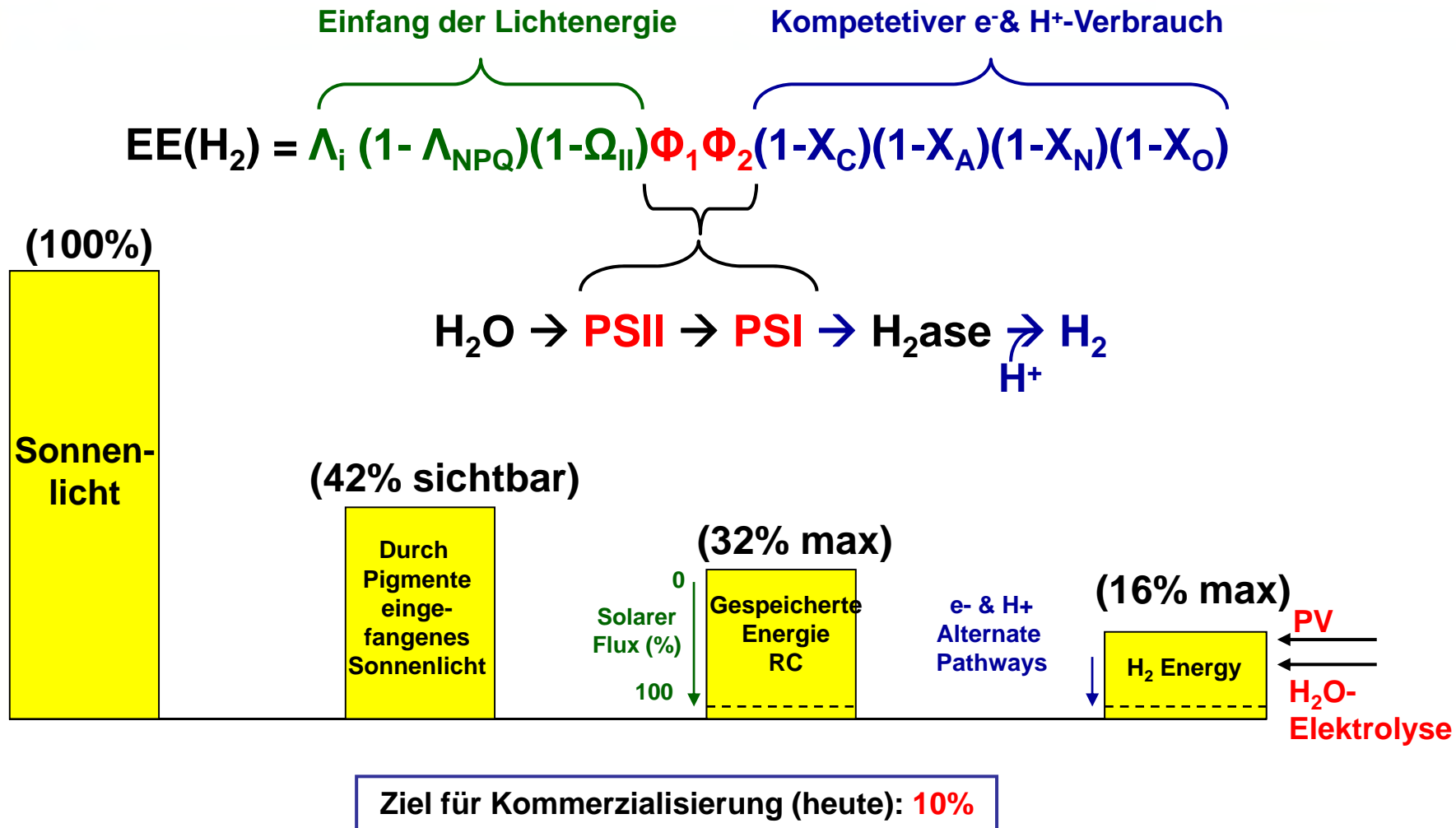


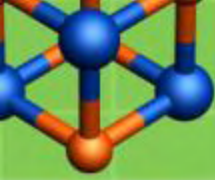
Lichtgetriebene Wasserstoffproduktion



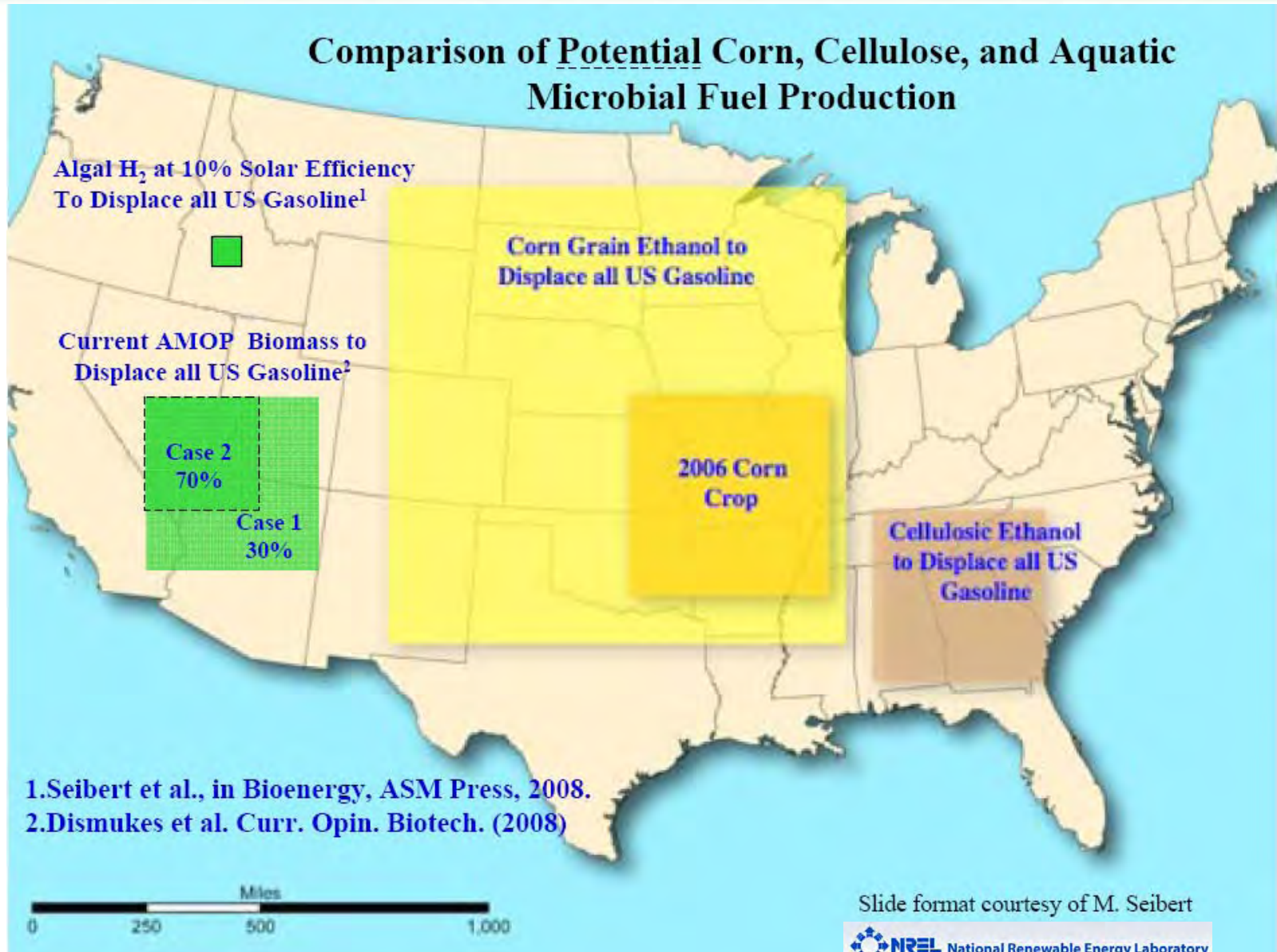


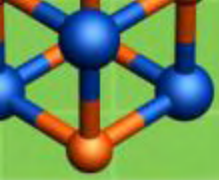
Solar-zu-H₂ : Energieeffizienz



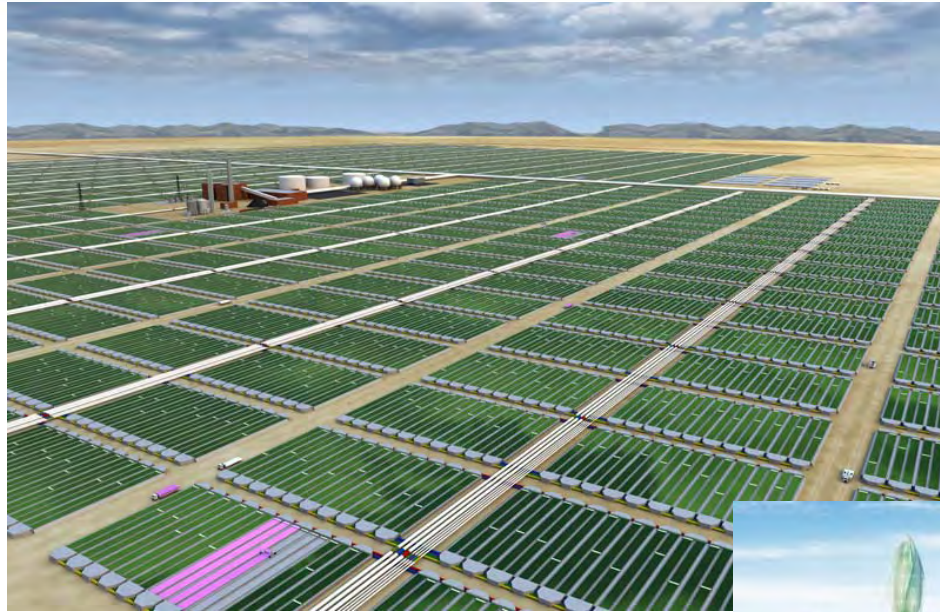


Bio-Treibstoffe: Optionen





Kultivierung von Cyanobakterien im großen Maßstab



<http://www.greenenergysupply.org/>



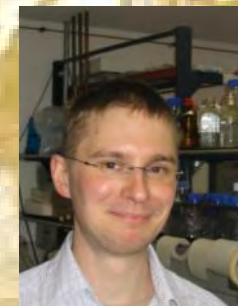
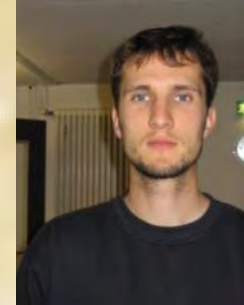
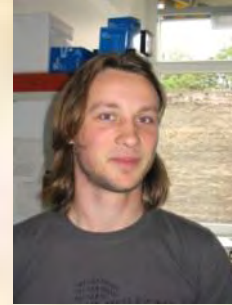
<http://www.electricitybook.com/algae-biodiesel-2/>

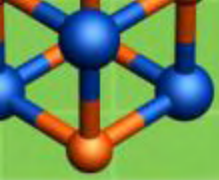


Peter Voßwinkel; <http://blogs.taz.de/architektur/>

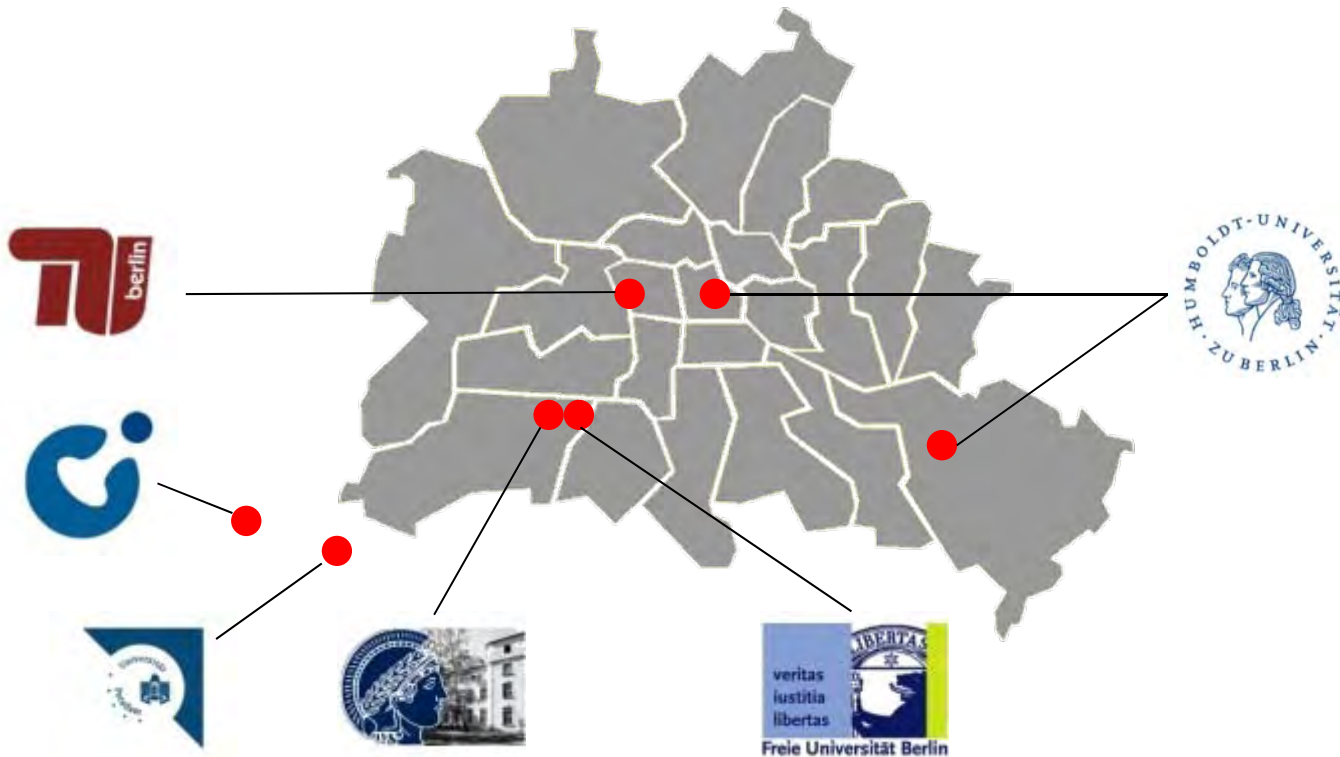


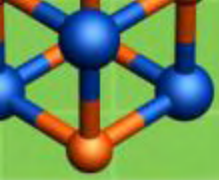
AG Mikrobiologie HU-Berlin





- ➔ activating small molecules (e.g. methane, ethane, hydrogen), and
- ➔ transforming them subsequently into value-added products (methanol)





H₂-Designzellen

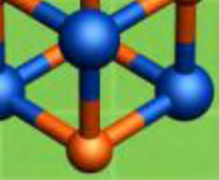


Max-Planck-Institut
für
Bioanorganische Chemie



Max Planck Institute for
Terrestrial Microbiology



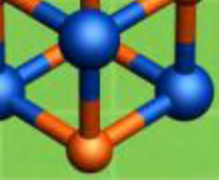


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für
Bioanorganische Chemie





Der H₂-Zyklus

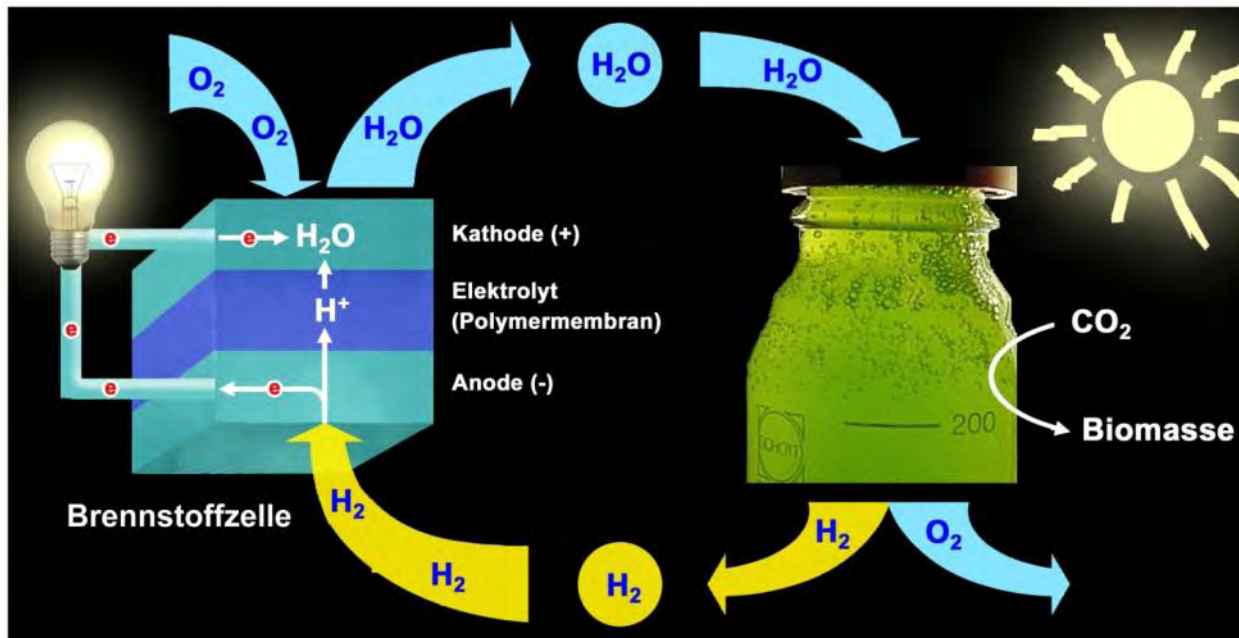


Abbildung:
Matthias Rögner, Bochum

„Das Wasser ist die Kohle der Zukunft. Die Energie von morgen ist Wasser, das durch elektrischen Strom zerlegt worden ist. Die so zerlegten Elemente des Wassers, Wasserstoff und Sauerstoff, werden auf unabsehbare Zeit hinaus die Energieversorgung der Erde sichern.“

Jules Verne (Die geheimnisvolle Insel, 1870)