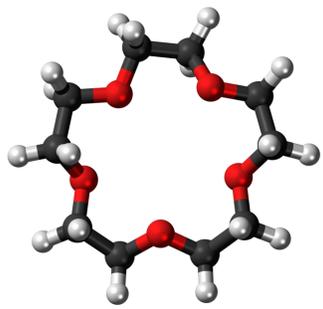




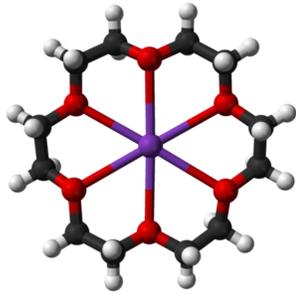
What is a macrocycle? And a porphyrin?

A **macrocycle** is a molecule containing a ring of eight or more atoms.



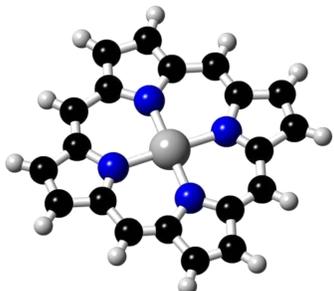
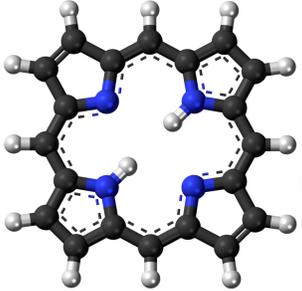
Crown ethers

Ring containing several oxygen atoms which strongly bind certain cations (e.g. K^+ , Na^+).

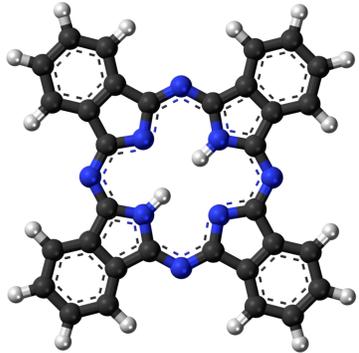


Porphyrins

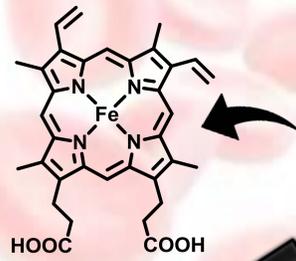
Cyclic molecules formed by the linkage of four nitrogen atoms. They can bind metals.



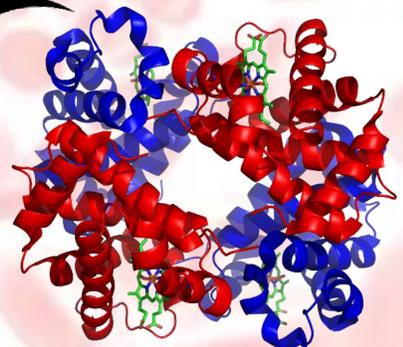
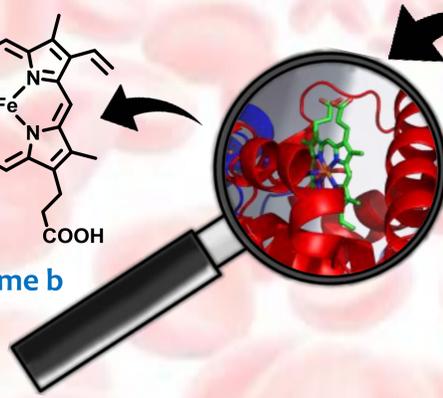
Phthalocyanines



Where are porphyrins in nature?

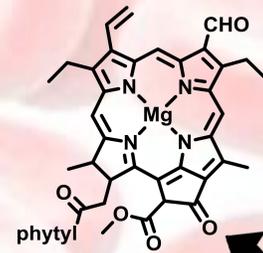


Heme b

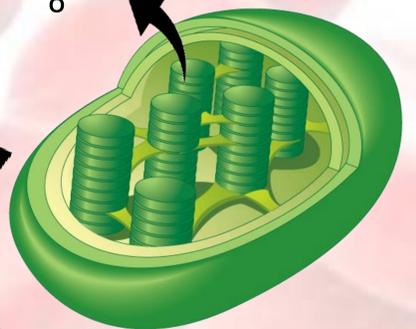


Hemoglobin

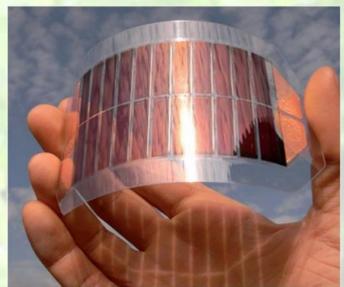
In blood



Chlorophyll

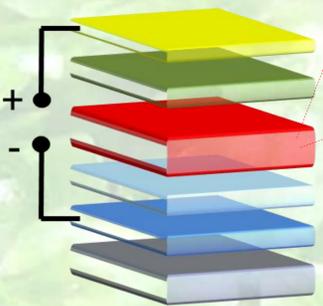
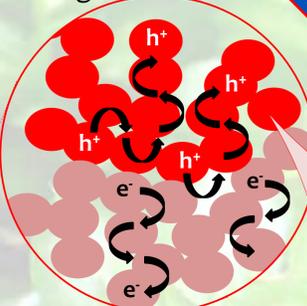


Chloroplast
In a leaf



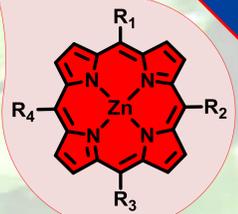
Organic solar cell

Separation of charges



Structure of an organic solar cell

Cathode
Transporting layer
Active layer
Transporting layer
Anode
Glass substrate



Bioenergy
100 TW



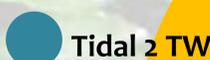
Geothermal 12 TW



Wind 4 TW



Hydro 3 TW



Tidal 2 TW

Solar
120,000 TW

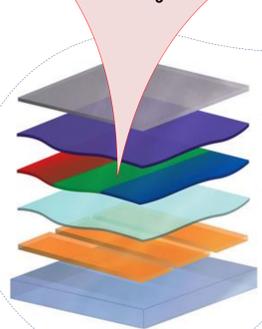
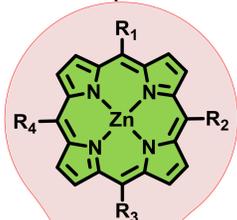
Organic photovoltaic devices convert solar energy to electrical energy. A typical device consists of several photoactive materials sandwiched between two electrodes.

Porphyrins as light absorbers



OLED screens

An OLED is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compound, which emits light in response to an electric current.

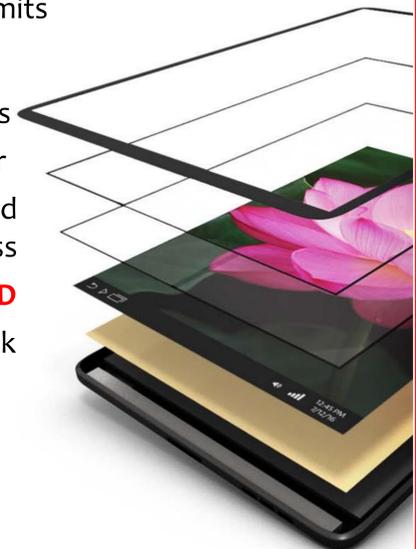


Cathode
Transporting layer
Organic emitters
Transporting layer
Anode
Glass substrate

Cover glass
Circular polarizer
Encapsulated glass

OLED

Heat sink



Structure of an OLED screen

Porphyrins as light emitters