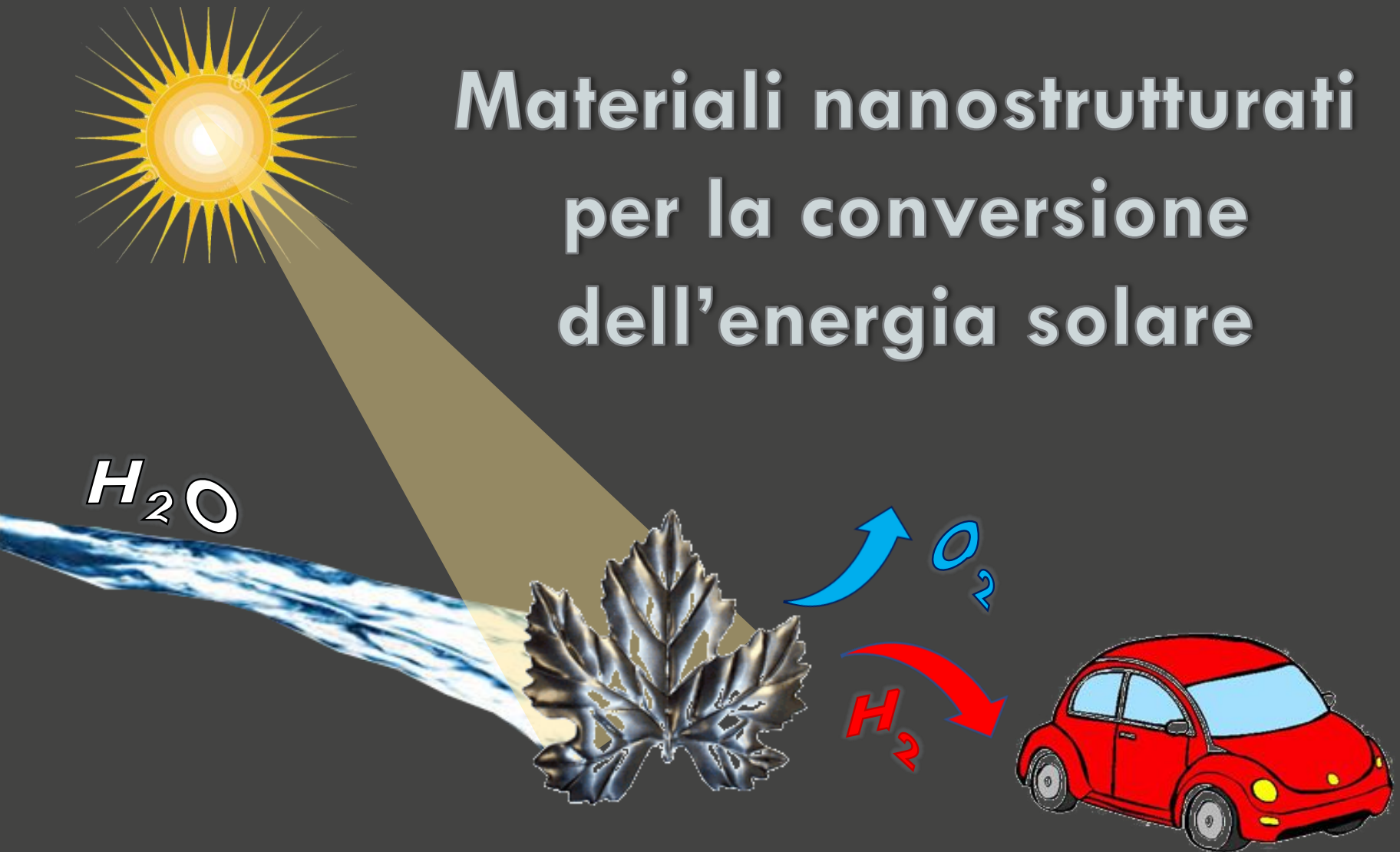


Materiali nanostrutturati per la conversione dell'energia solare



Lorenzo Mino

Piano Nazionale di Ripresa e Resilienza

2

6
Missioni



PNRR – Transizione ecologica

3

COMPONENTI E RISORSE (MILIARDI DI EURO):



59,47

Totale

**M2C1 - ECONOMIA CIRCOLARE E AGRICOLTURA
SOSTENIBILE** 5,27

**M2C2 - ENERGIA RINNOVABILE, IDROGENO, RETE
E MOBILITÀ SOSTENIBILE** 23,78

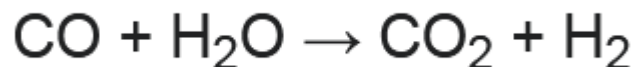
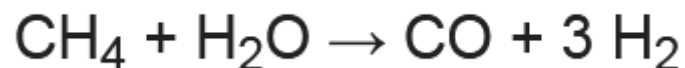
**M2C3 - EFFICIENZA ENERGETICA E
RIQUALIFICAZIONE DEGLI EDIFICI** 15,36

**M2C4 - TUTELA DEL TERRITORIO E DELLA RISORSA
IDRICA** 15,06

I colori dell'idrogeno

4

Grey hydrogen	Blue hydrogen	Green hydrogen
Split natural gas into hydrogen and CO ₂	Split natural gas into hydrogen and CO ₂	Split water into hydrogen by electrolysis powered by water or wind
CO ₂ emitted in the atmosphere	CO ₂ stored or reused	No CO ₂ emitted



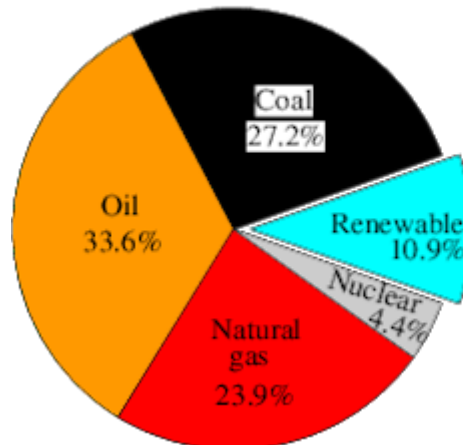
Energia dal Sole

5



Global Energy Consumption in Fraction, 2018

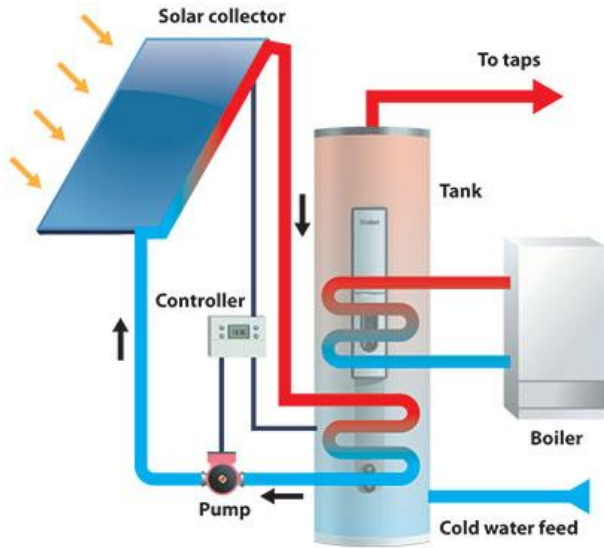
All Fuel Types (13.9 Gtoe)



Catturare la luce solare

6

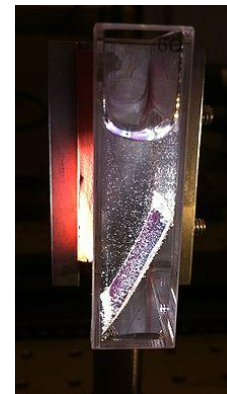
Thermal solar energy



Photovoltaics

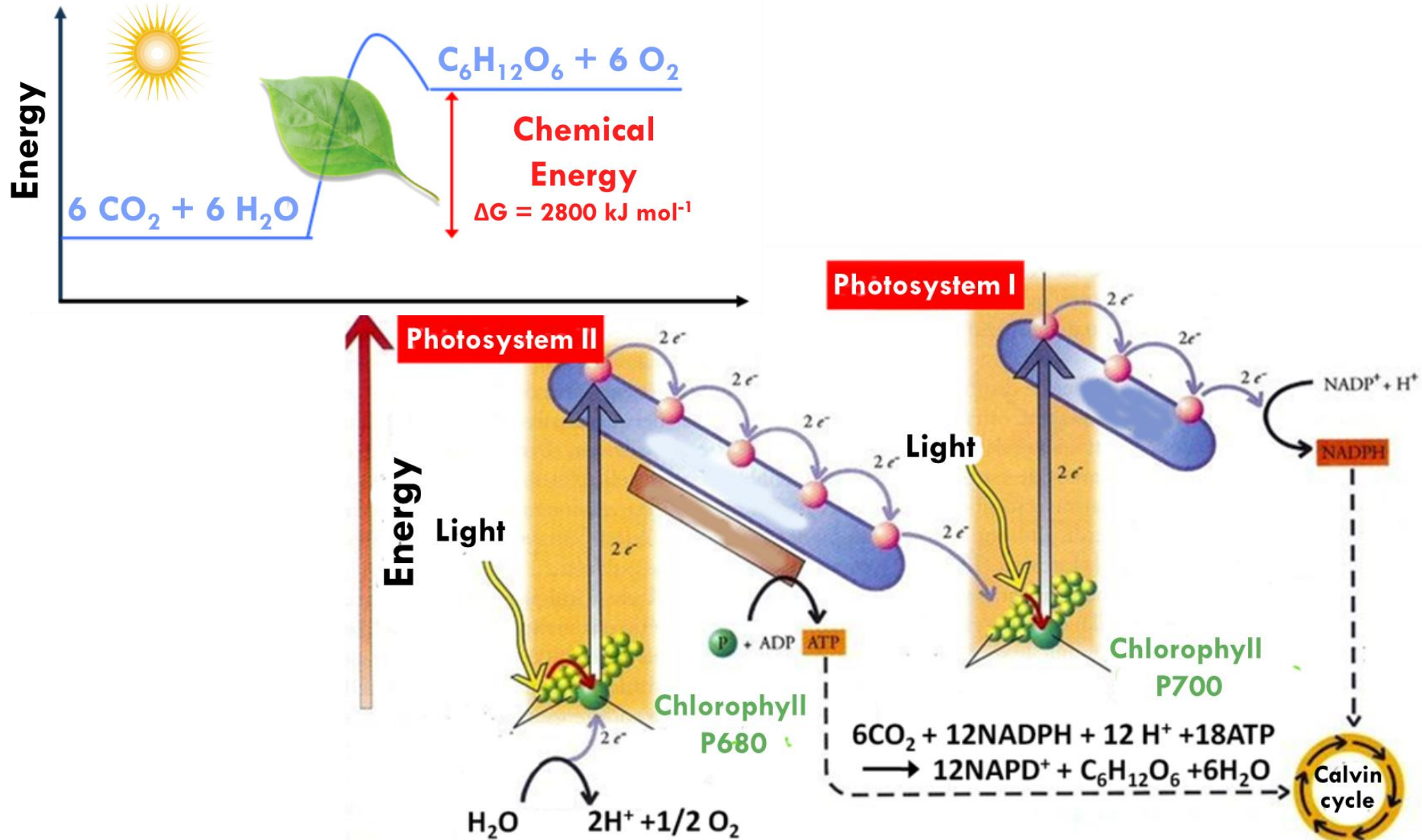


Artificial photosynthesis



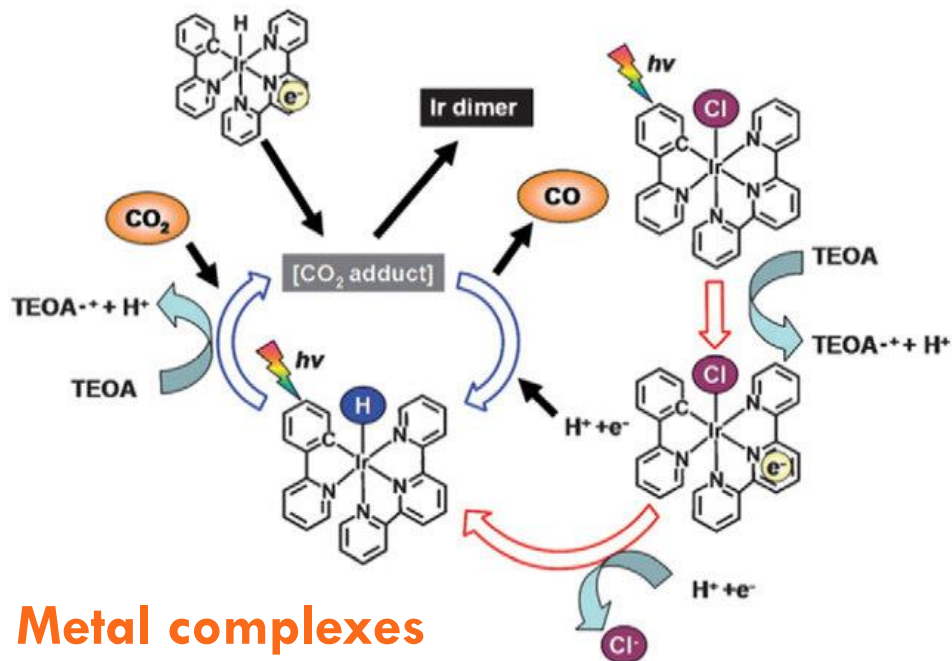
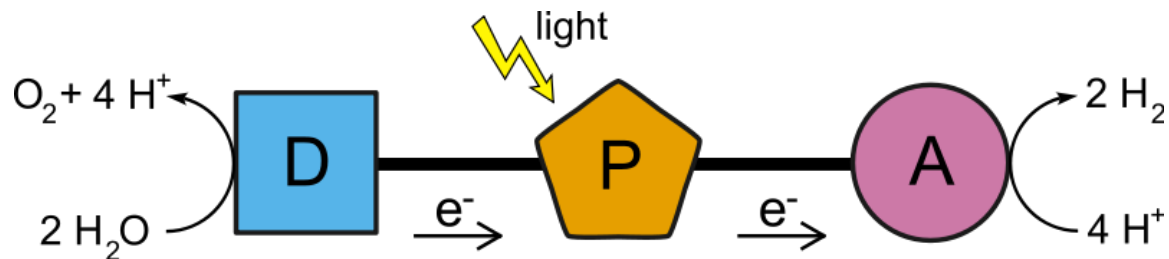
Fotosintesi naturale

7

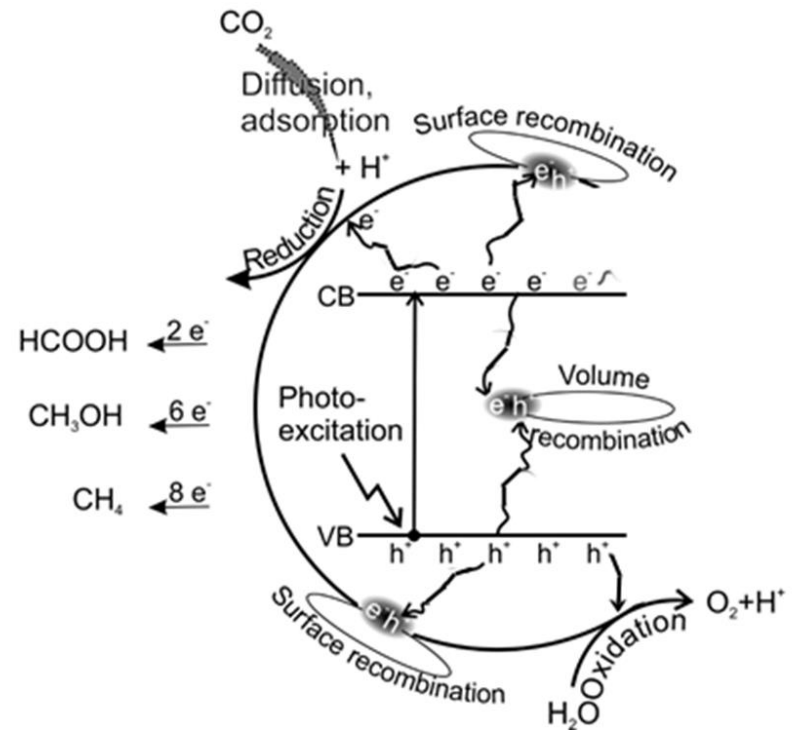


Fotosintesi artificiale

8



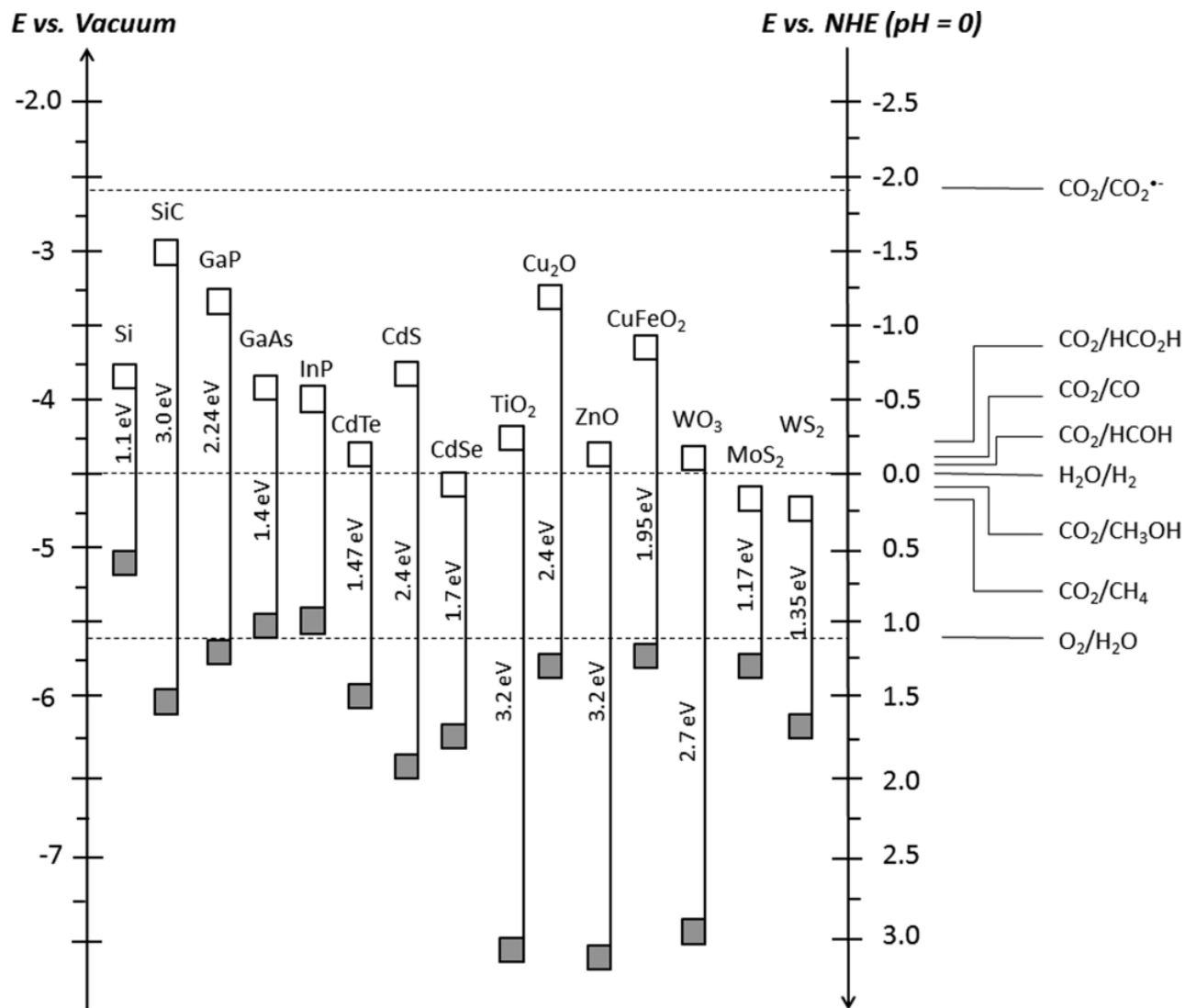
Metal complexes



Semiconductors

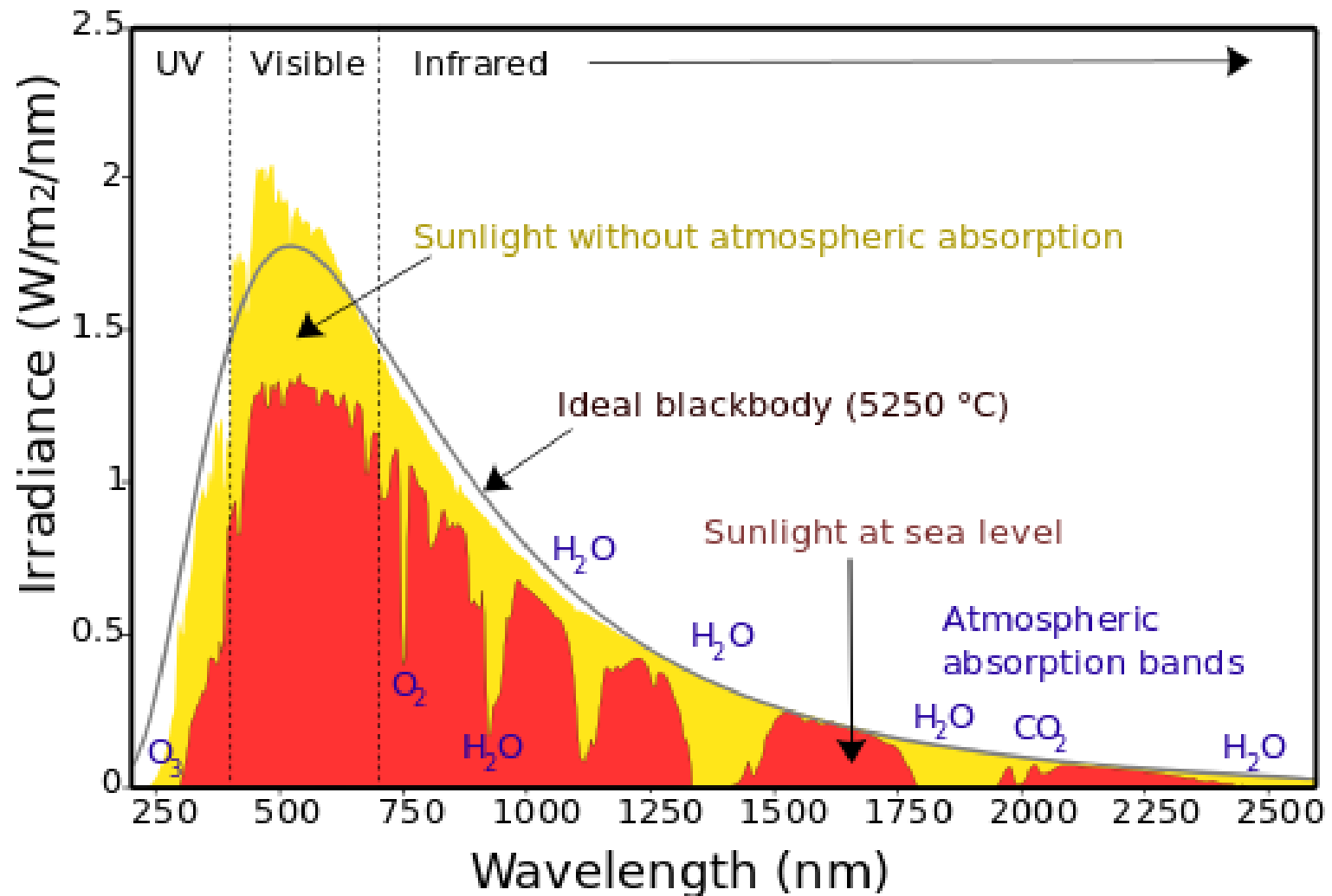
Quale semiconduttore?

9



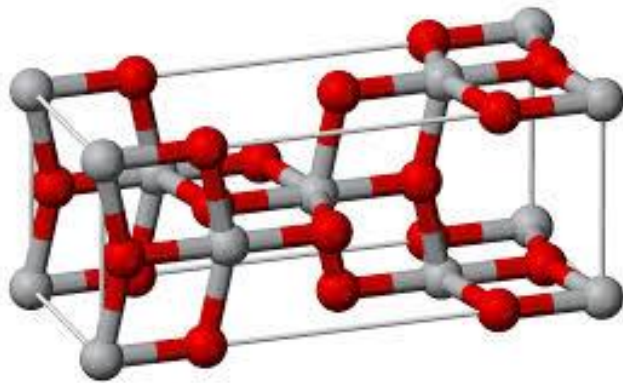
Spettro della radiazione solare

10

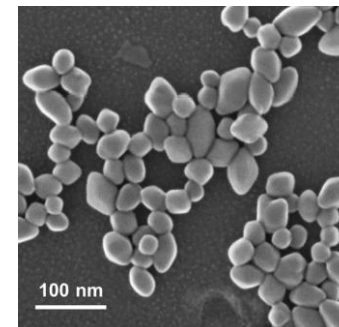
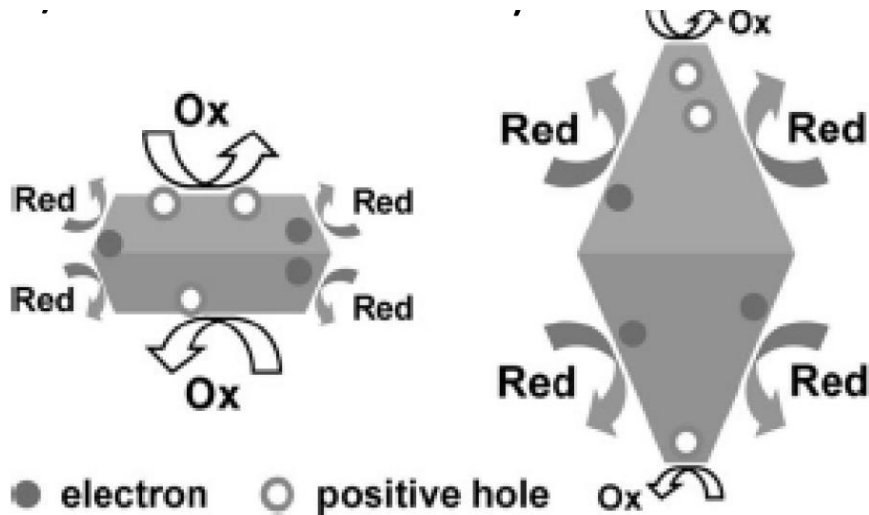


Biossido di titanio (TiO_2)

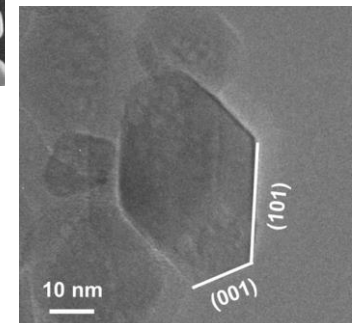
11



TiO_2 anatase
Band gap 3.2 eV

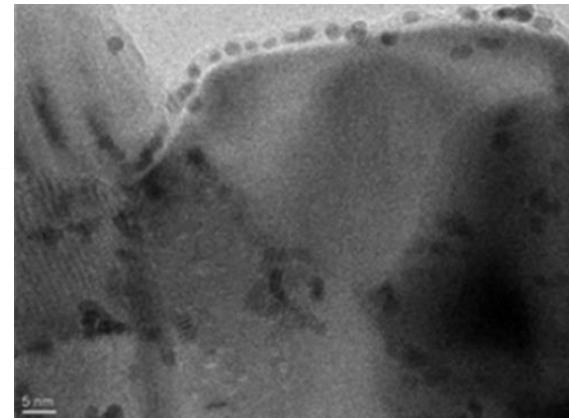
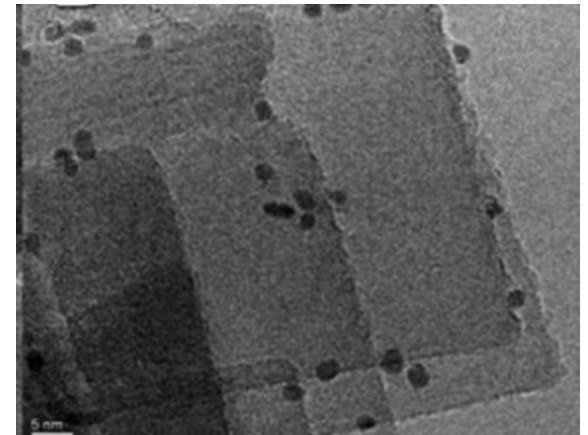
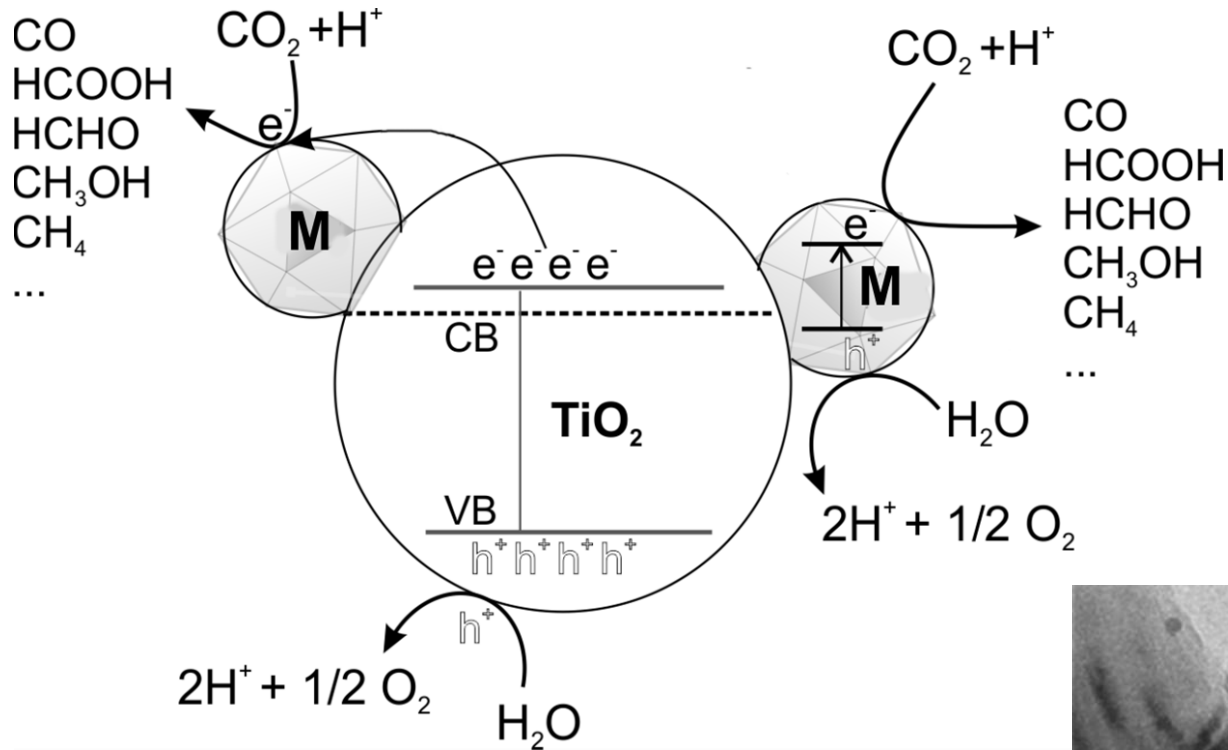


**TiO_2
bipyramids**



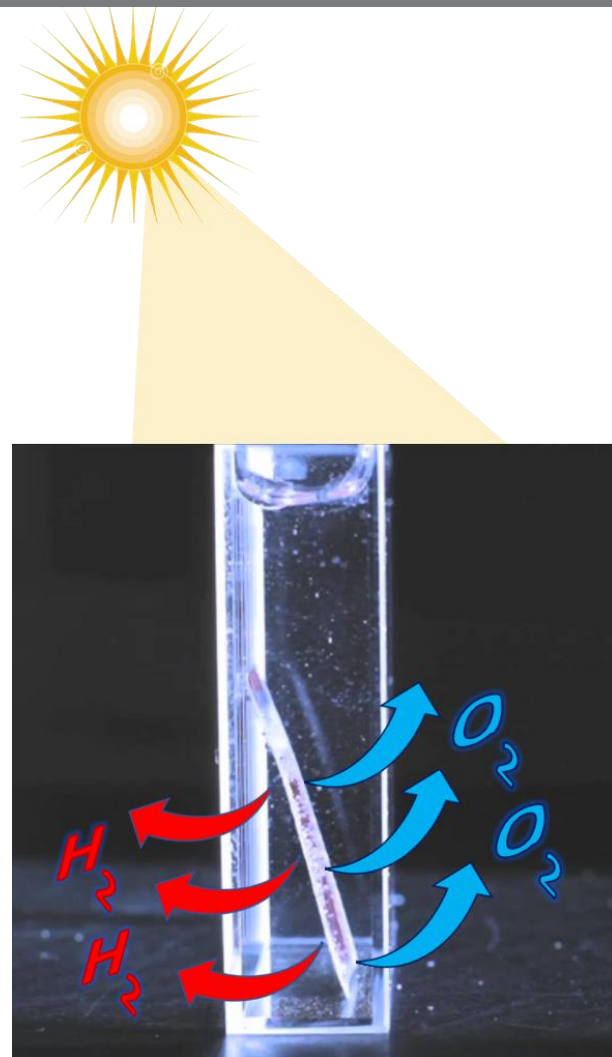
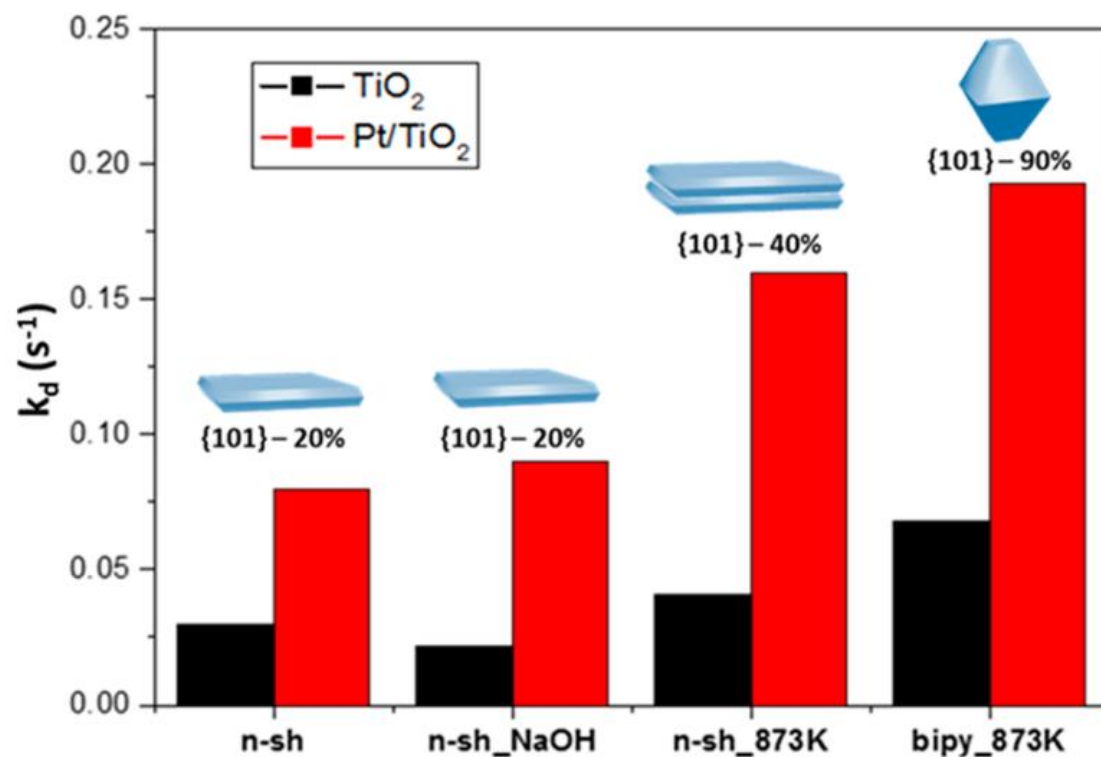
Funzionalizzazione con metalli

12



Test di fotoproduzione di H_2

13



Possibili attività per progetti di tesi

14

Sintesi

Sintesi di interfacce metallo
/semiconduttore

Sintesi di interfacce
grafene/semiconduttore



Caratterizzazione al sincrotrone

Possibili esperimenti con
spettroscopie XAS o XPS in luce di
sincrotrone



Caratterizzazione in laboratorio

Microscopia elettronica, diffrazione di
raggi X, spettroscopie elettroniche e
vibrazionali

Test di fotoattività

Test di fotoattività per l'applicazione
target (e.g. fotoproduzione di H_2 ,
fotoriduzione di CO_2)

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Dipartimento di Chimica, via Giuria 7

**Link alla registrazione Webex della
presentazione dei progetti di tesi:**

<https://unito.webex.com/unito/jdr.php?RCID=0fa5e15e724a049d3e02453a4f2079cb>