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Enseignement:

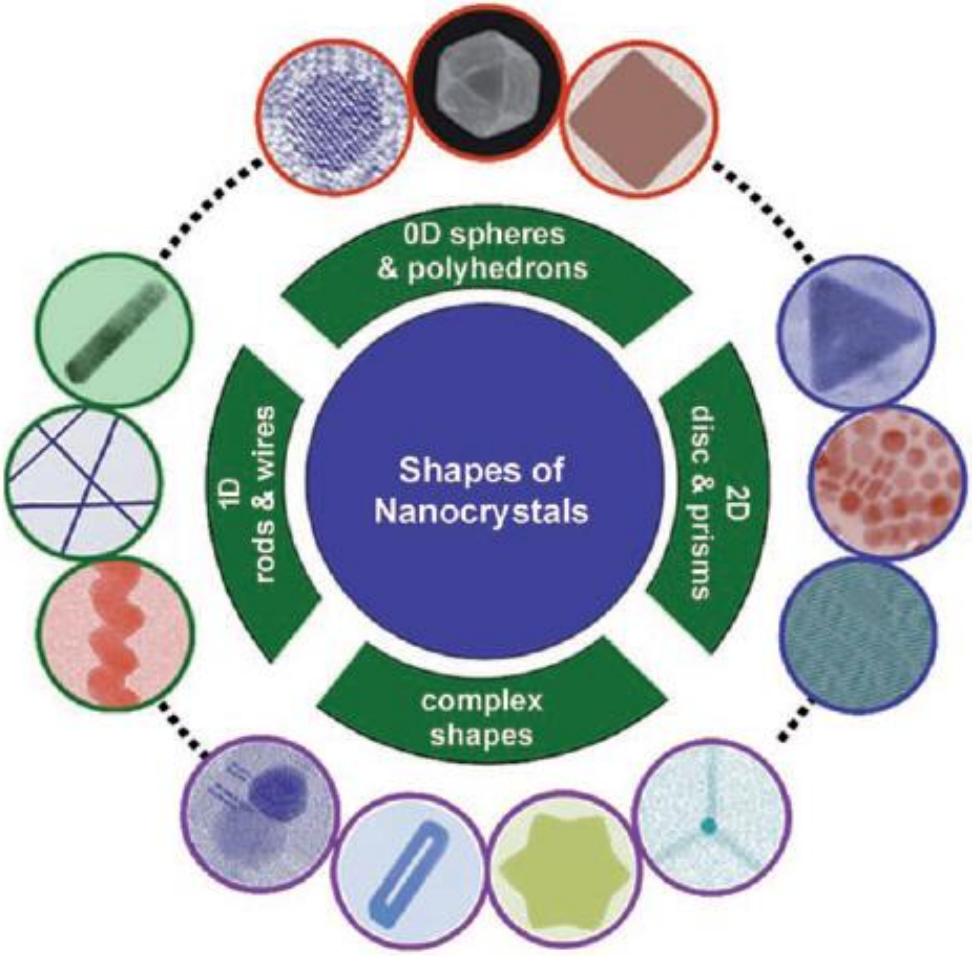
Cours du 1er Cycle

- Thermodynamique du génie chimique I (GCH-1001)
- Séparation avec transfert de matière (GCH-2003)

Cours de 2ème et 3ème Cycles

- Nanomatériaux et leur application en catalyse (GCH-7012)

RESEARCH ACTIVITIES ON NANOMATERIALS WITH CONTROLLED SIZE AND SHAPE



Photocatalysis
Energy
Biology
Medecine
Sensors, optics
etc.

RESEARCH ACTIVITIES
PROF. DO's GROUP

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Trong-On Do et al., *Chemical Comm.,* **2015,** 51, 624-635, Invited Feature Article.

RESEARCH ACTIVITIES ON PHOTOCATALYSIS

1. Production H_2 from H_2O
2. Conversion CO_2 to fuels
3. Air purification
4. Water depollution

RESEARCH ACTIVITIES

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(i) Why solar energy ?

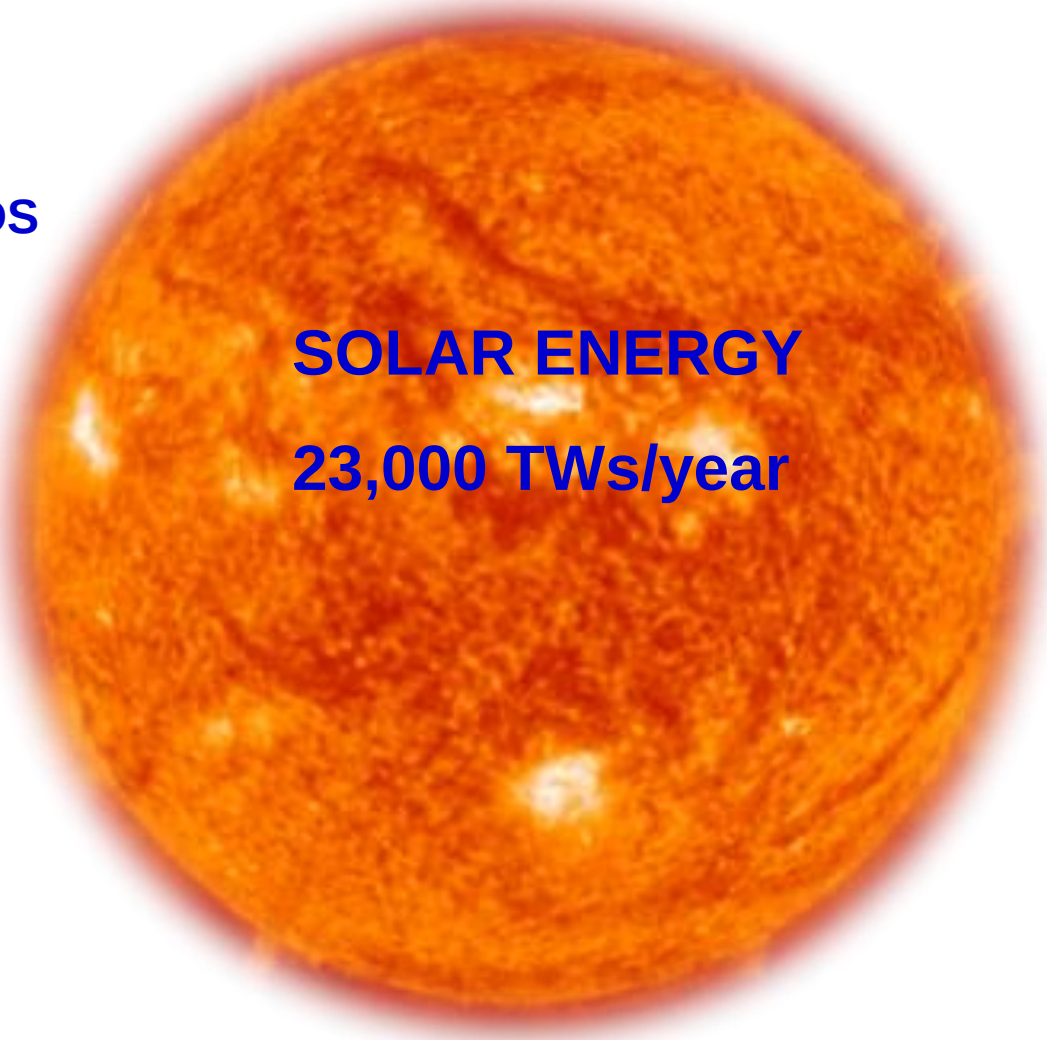
ANNUAL WORLD ENERGY NEEDS

in 2009 **in 2050**

16 TWs/ year **30 TWs/ year**

Terawats (TMs)

Solar Energy → valuable energies: H_2 from H_2O



Largest Energy Source

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(ii) Why hydrogen ?

$H_2 + ½ O_2 \rightarrow H_2O$ **(143 kJ/g)**

First: High energy yield achieved, compared to other fuels, such as gasoline (~ 45 kJ/g)

Second: no pollutants

H_2 as clean energy!

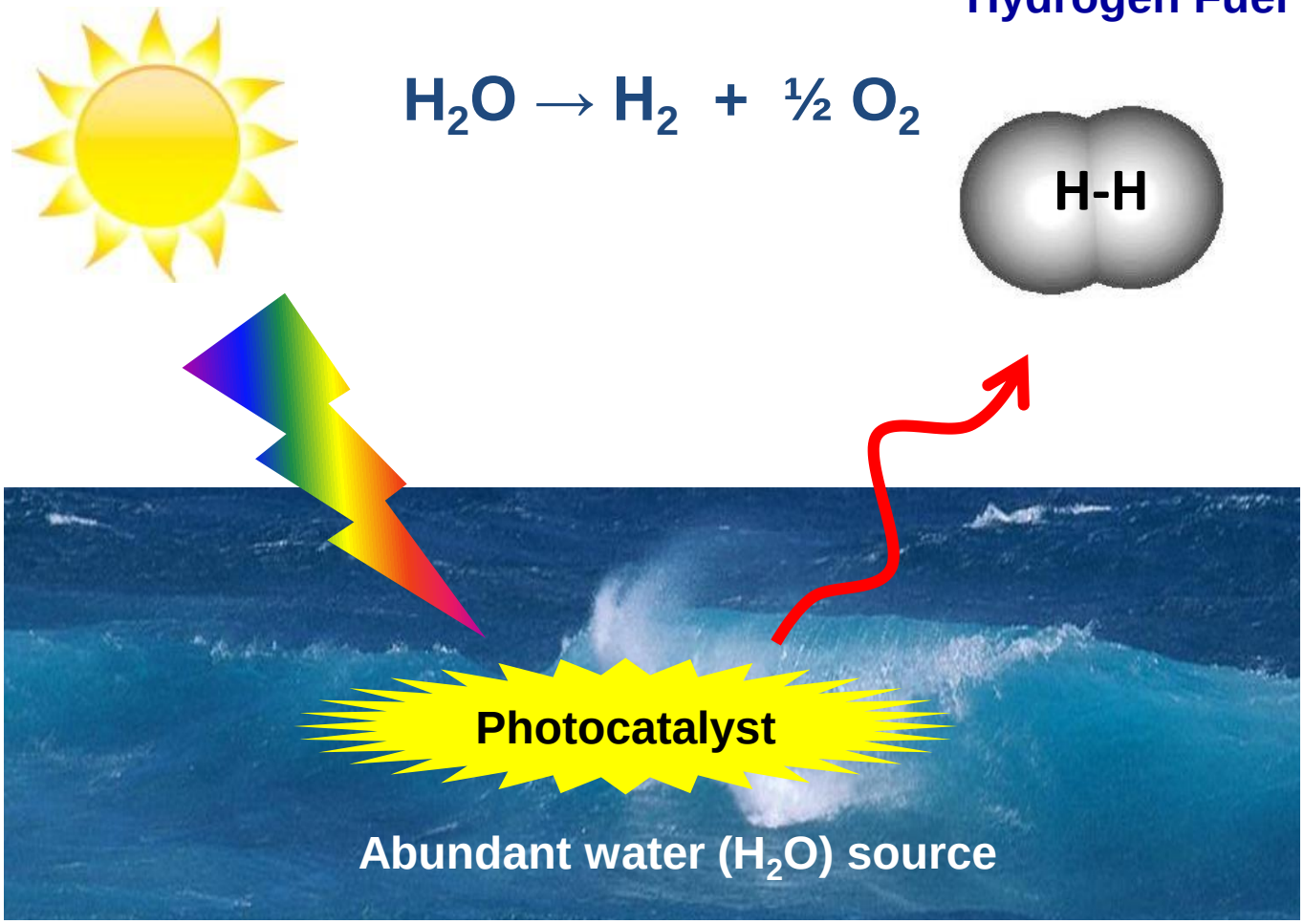
How to solve it?

CLEAN ENERGY: → H_2 production:

Sunlight

Hydrogen Fuel

$$H_2O \rightarrow H_2 + \frac{1}{2} O_2$$



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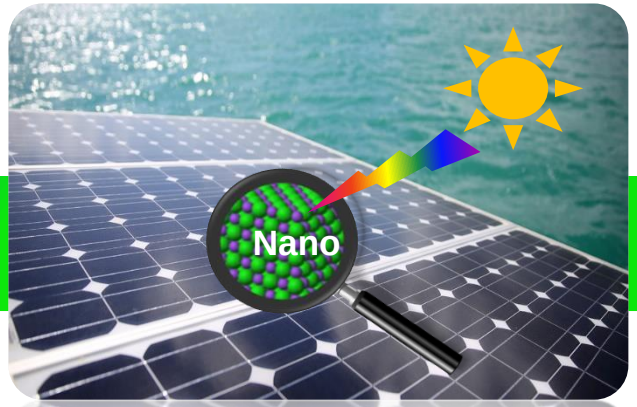
Solar production of H_2 from water splitting

Water

Photocatalyst



Hydrogen Fuels

$$H_2O \rightarrow \mathbf{H_2} + \tfrac{1}{2}\, O_2$$

Solar conversion of CO_2 into valuable fuels

Greenhouse Gas

Photocatalyst

Fuels (CH_3OH, C_2H_5OH)

$CO_2 \rightarrow$ $CH_3OH + C_2H_5OH$ etc.

Future works

Optimize Catalyst Composition and Photocatalytic Conversion

&

UNIVERSITÉ LAVAL

Mini-symposium Prof. Do'group July 2017

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UNIVERSITÉ LAVAL
Faculté des sciences et de génie
Département de génie chimique

SILICYCLE UltraPure SILICA GELS

oleotek

exp.

Centre in Green Chemistry and Catalysis


Thank You !