



The University *Historic & Prestigious*



Founded in **1583** (... 435 year ago ...)

Ranked **15th** ~ **20th** world-wide every year

e.g. **18th** in 2018/19 (*QS World Ranking*)

Ranked **2nd in the latest UK** Research Excellence Framework [2014] by power ranking (1st Oxford)

~ **50% of students** from **outside the UK**

Associated with **19 Nobel Prize winners** – in Chemistry, Physics, Medicine, Economics, ... most recently:

Peter Higgs, Nobel laureate in **Physics** (2013)

Fraser Stoddart, Nobel laureate in **Chemistry** (2016)
—> studied “Chemistry” in our School of Chemistry
(The University of Edinburgh)





THE UNIVERSITY of EDINBURGH

School of Chemistry

Founded in 1713 – 305 years ago ...

Oldest Chemical Society in the World – **1785**

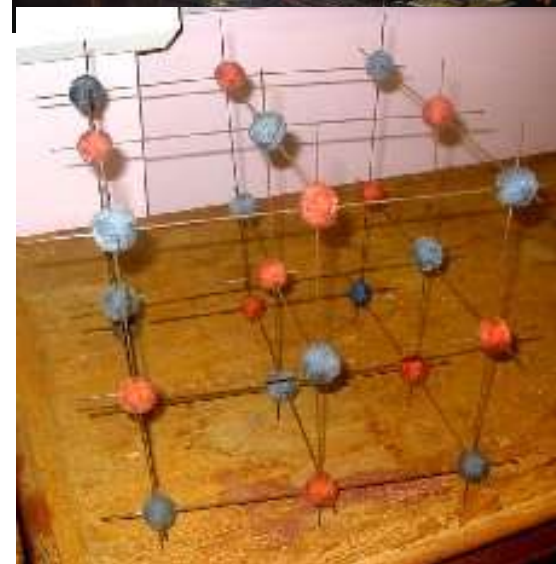
EaStCHEM ranked 2nd in UK in the latest Research Excellence Framework

[REF 2014; Oxford 1st]

Joseph Black (1755) – *discovered CO₂*

Alexander Crum Brown (1869) – *pioneered molecular models*

- (General) Chemistry
- Focus on: **Environmental & Sustainable** Chemistry
- Focus on: **Materials** Chemistry
- Focus on: **Medicinal & Biological** Chemistry





The **2+2** or **2+3** Programs

- **2 years** in China ...

2+2:

- **2 years** at Edinburgh University
- Graduate: **BSc** (double degree)

2+3:

- **3 years** at Edinburgh University
- Graduate: **MChem**



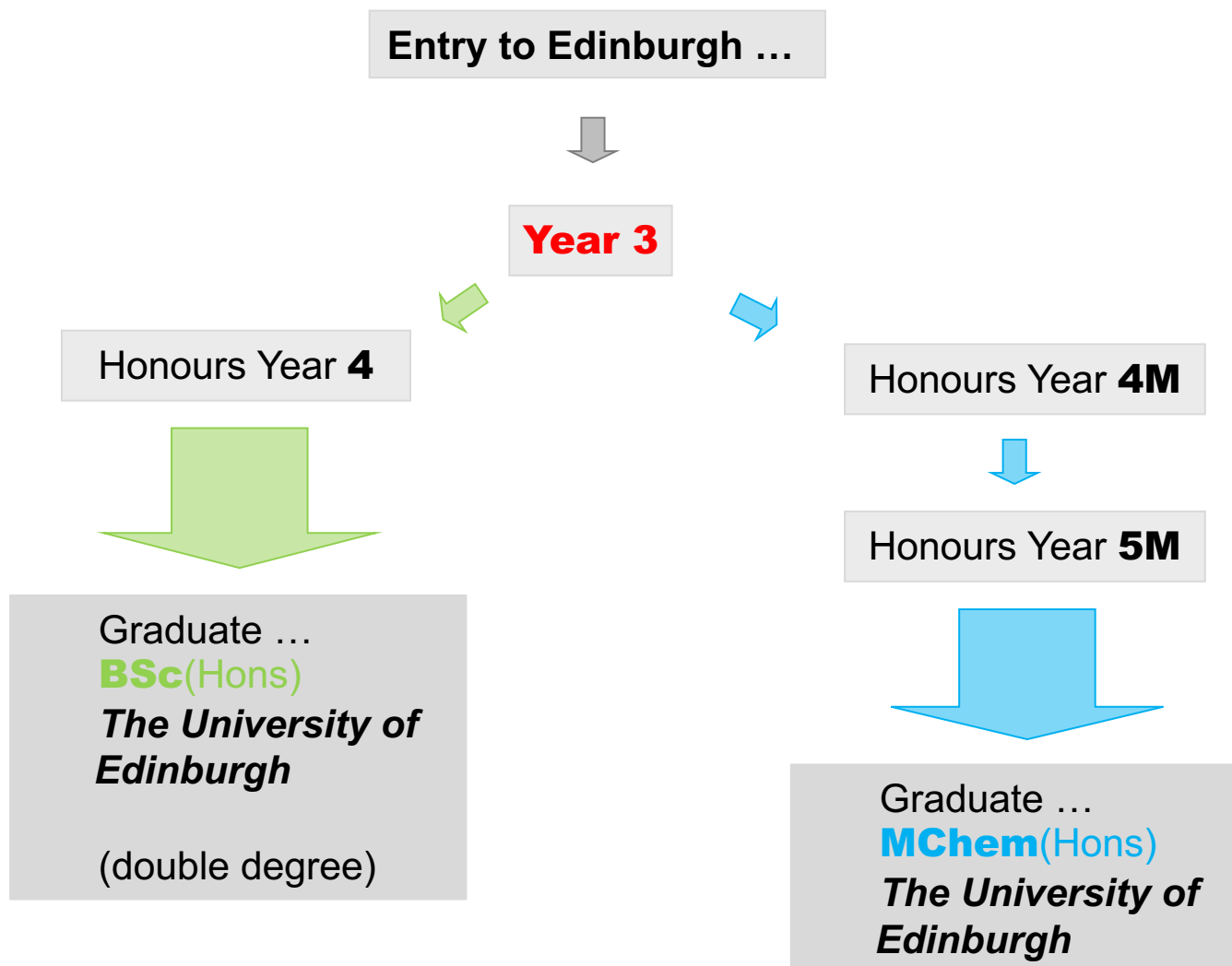
“Specialisation”:

- (General) Chemistry
- Focus on: ***Environmental & Sustainable*** Chemistry
- Focus on: ***Materials*** Chemistry
- Focus on: ***Medicinal & Biological*** Chemistry





2+2 or 2+3 – means: 2 or 3 Years in Edinburgh





2+2 (BSc) vs. **2+3 (MChem)**

- **Year 3** – identical for everyone: **Organic–Inorganic–Physical Chemistry**

Teaching load per week:

~ **9** h lectures + ~ **3** h tutorials + ~ **2** h “transferable skills” + **12** h laboratory courses

—> **4 written exams** in April ~ May (pass with 40%)

- **Year 4** – **Organic–Inorganic–Physical Chemistry** + your chosen “specialised” field

Teaching load per week:

~ **12** h lectures + ~ **2** h tutorials + ~ **2** h “transferable skills” +

~ **200** h **research project** (BSc; individual) or ~ 4 x **50** h **advanced lab project** (4P; group)

—> **4 written exams** in April ~ May (pass with 40%)

- **Year 5** – one-year **research project** in your **chosen “specialised” field** (no classes etc.)

(a) **Edinburgh / School of Chemistry**

(b) partner **Industry** [UK or abroad] or partner **University abroad** – selection process ...



THE UNIVERSITY *of* EDINBURGH

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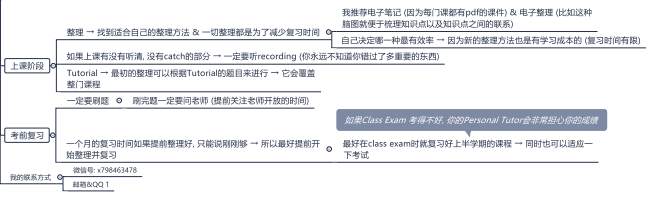
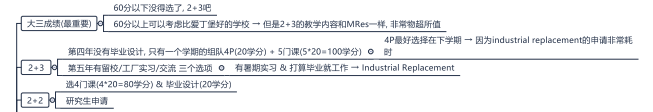
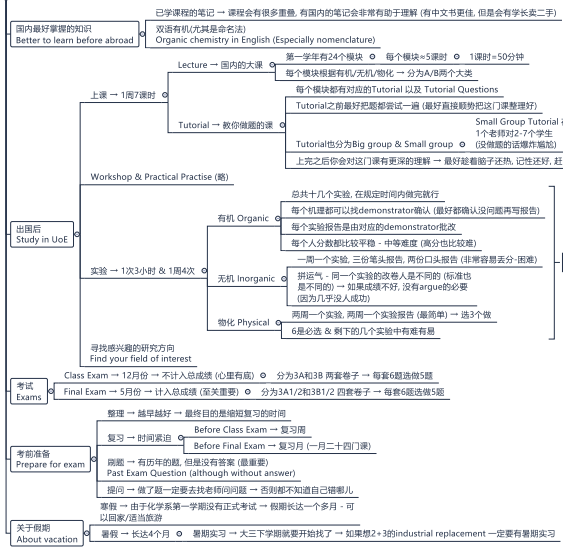
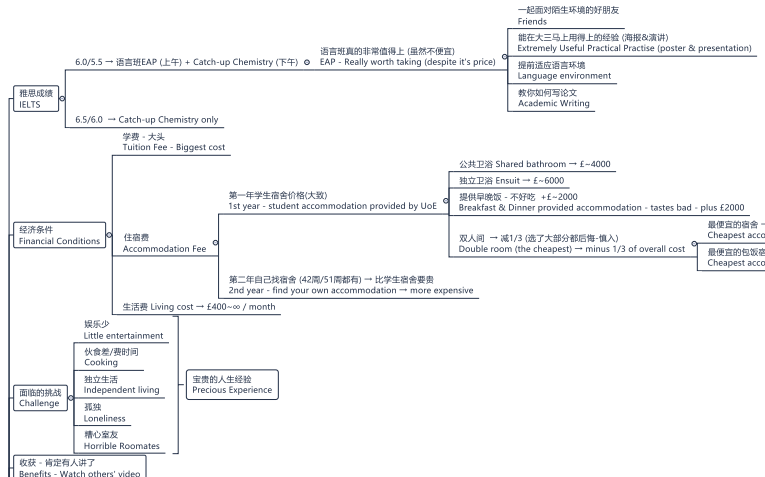
WHAT TO CONSIDER & MY ADVICES
你该考虑点啥 & 学长的建议

现在要考虑 -- 是否参加项目
PRESENT -- UOE - WHETHER OF NOT

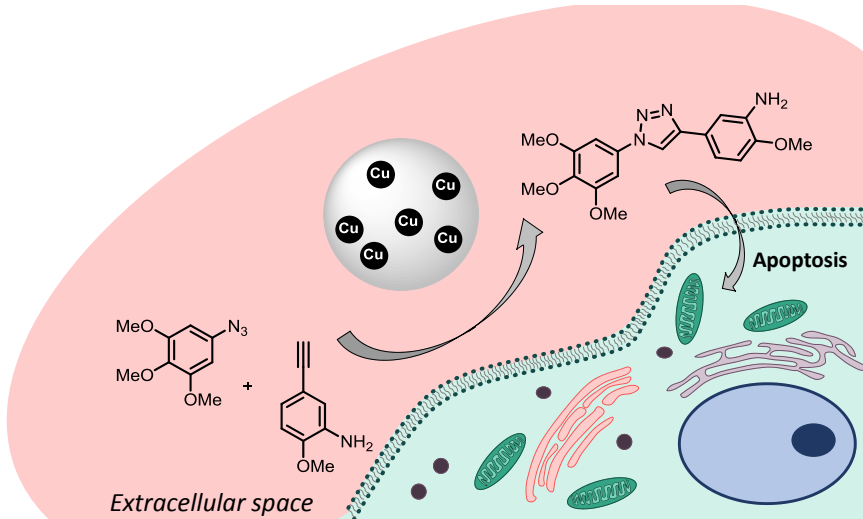
决定后 -- 大四暑假 -- 如何学习
AFTER DECISION - NEXT SUMMER -- HOW TO STUDY

大四 -- 是否选择2+3 (我只知道这些)
4TH YEAR -- 2+3 OR NOT (LIMITED ADVICES)

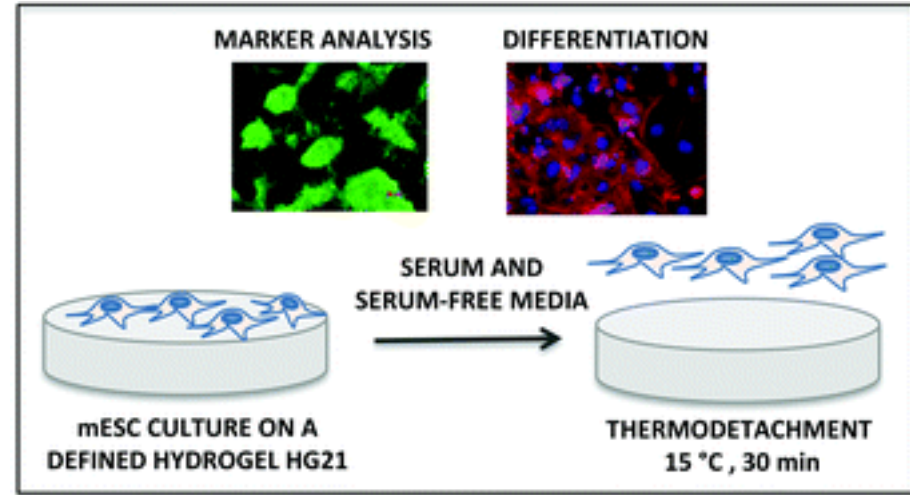
我的学习技巧
MY TIPS FOR LEARNING



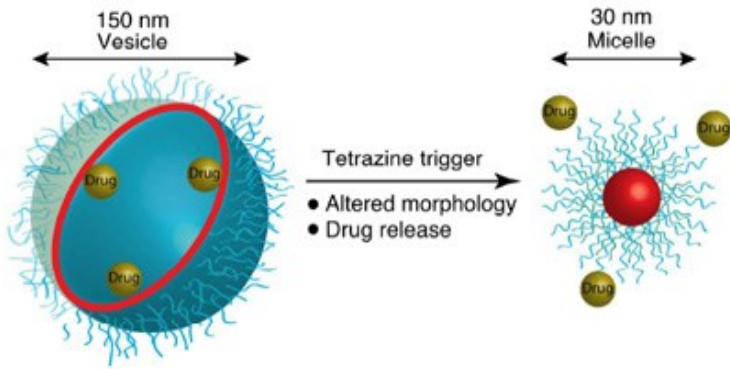
Bio-Engineering & Its Various Applications



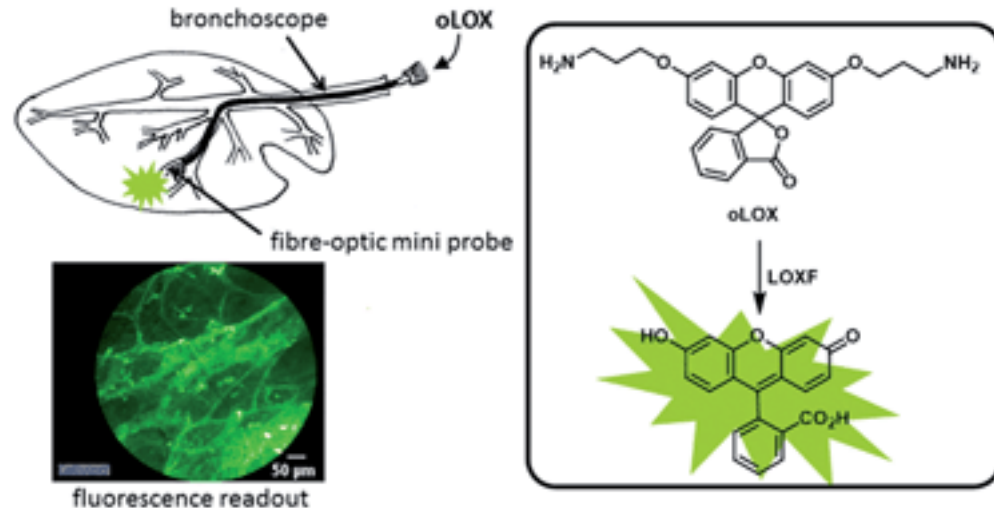
Transition metal catalysis in living cells



Biomaterials for stem cell modulation



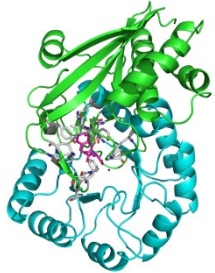
Responsive smart material for controlled drug delivery



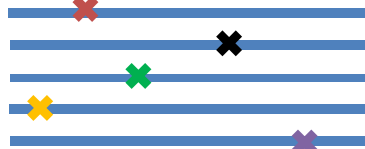
Optical imaging

Bio-Engineering – Modifying Enzymes and Screening ...

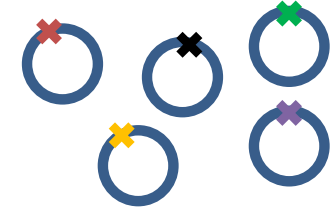
1. Computer-aided design



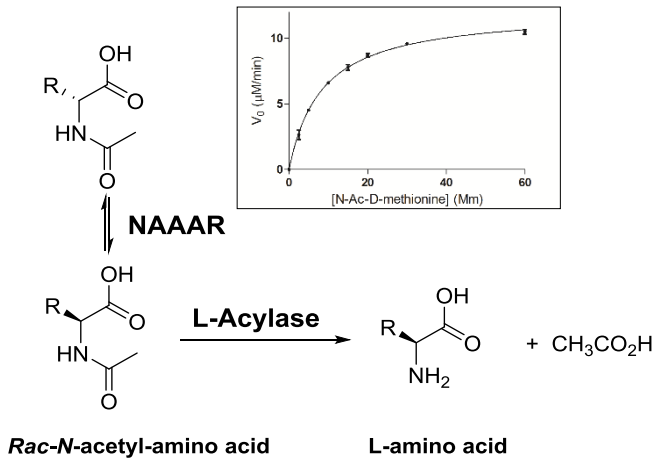
2. Semi-rational and random mutagenesis



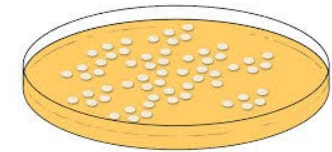
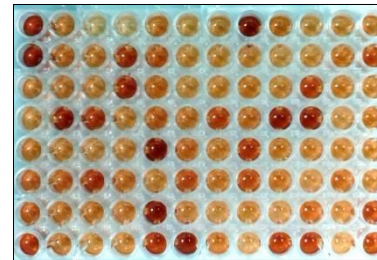
3. Mutant library creation



5. Mutant characterization

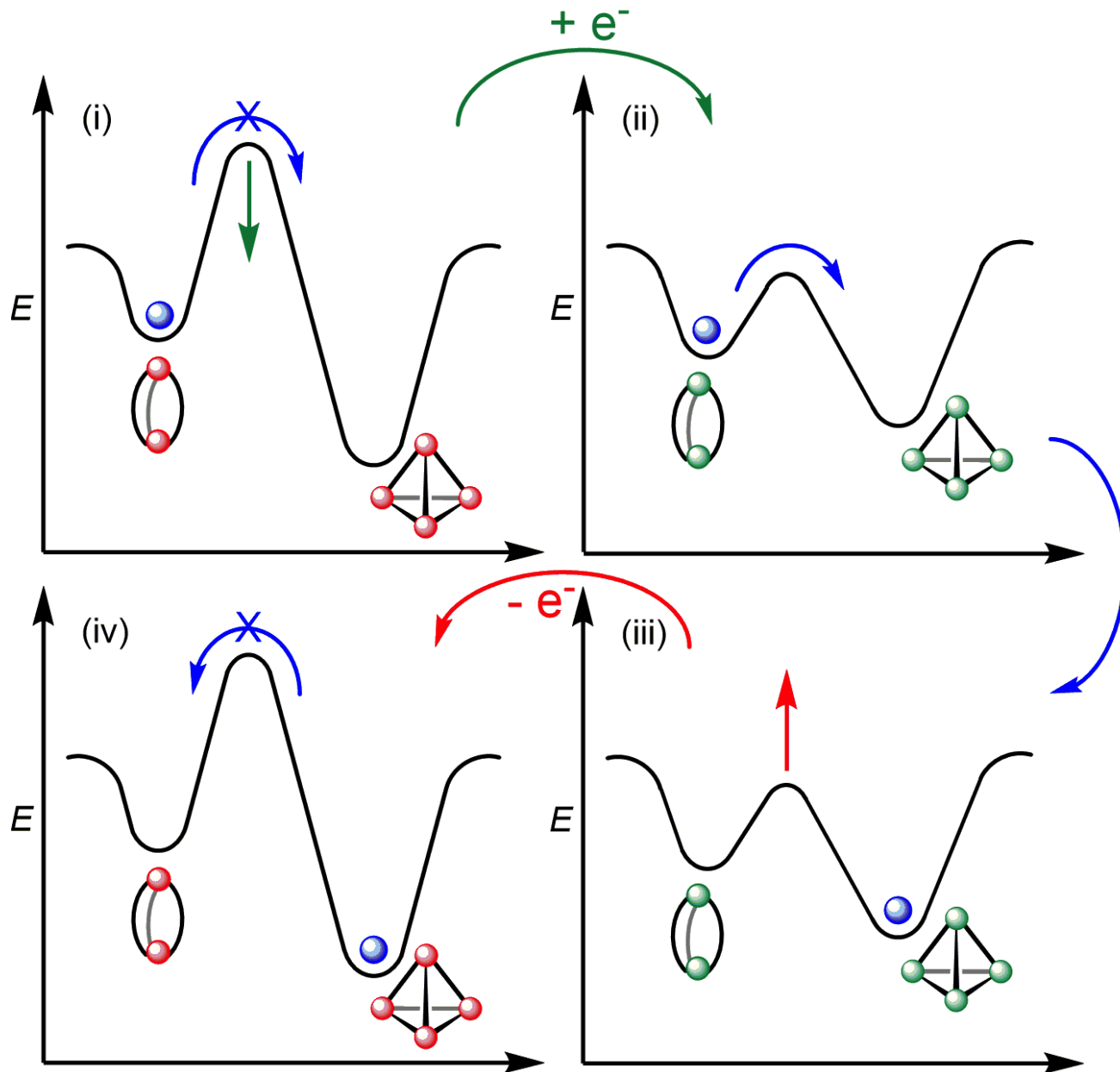


4. Library screening

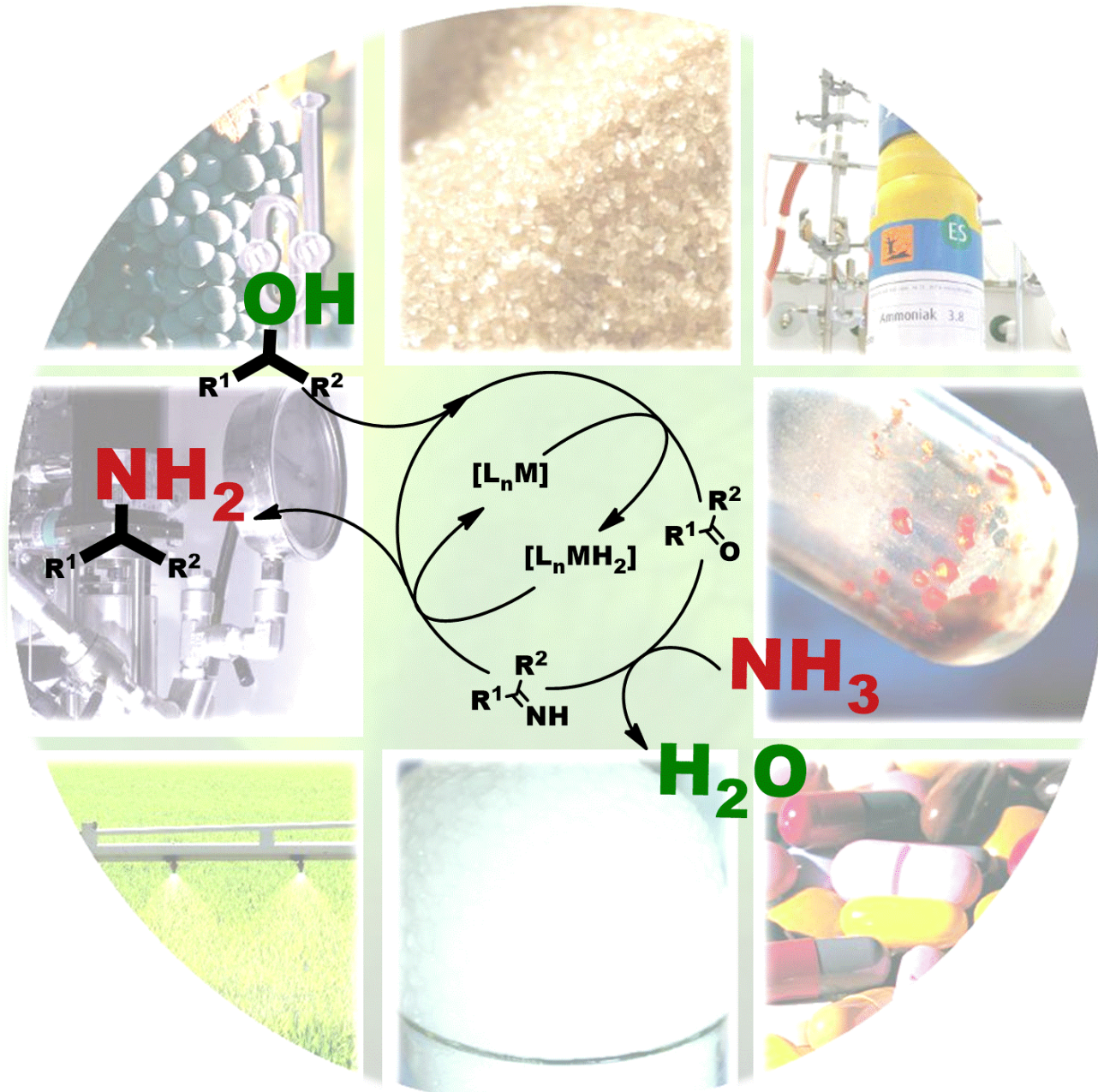


NAAAR engineering/evolution

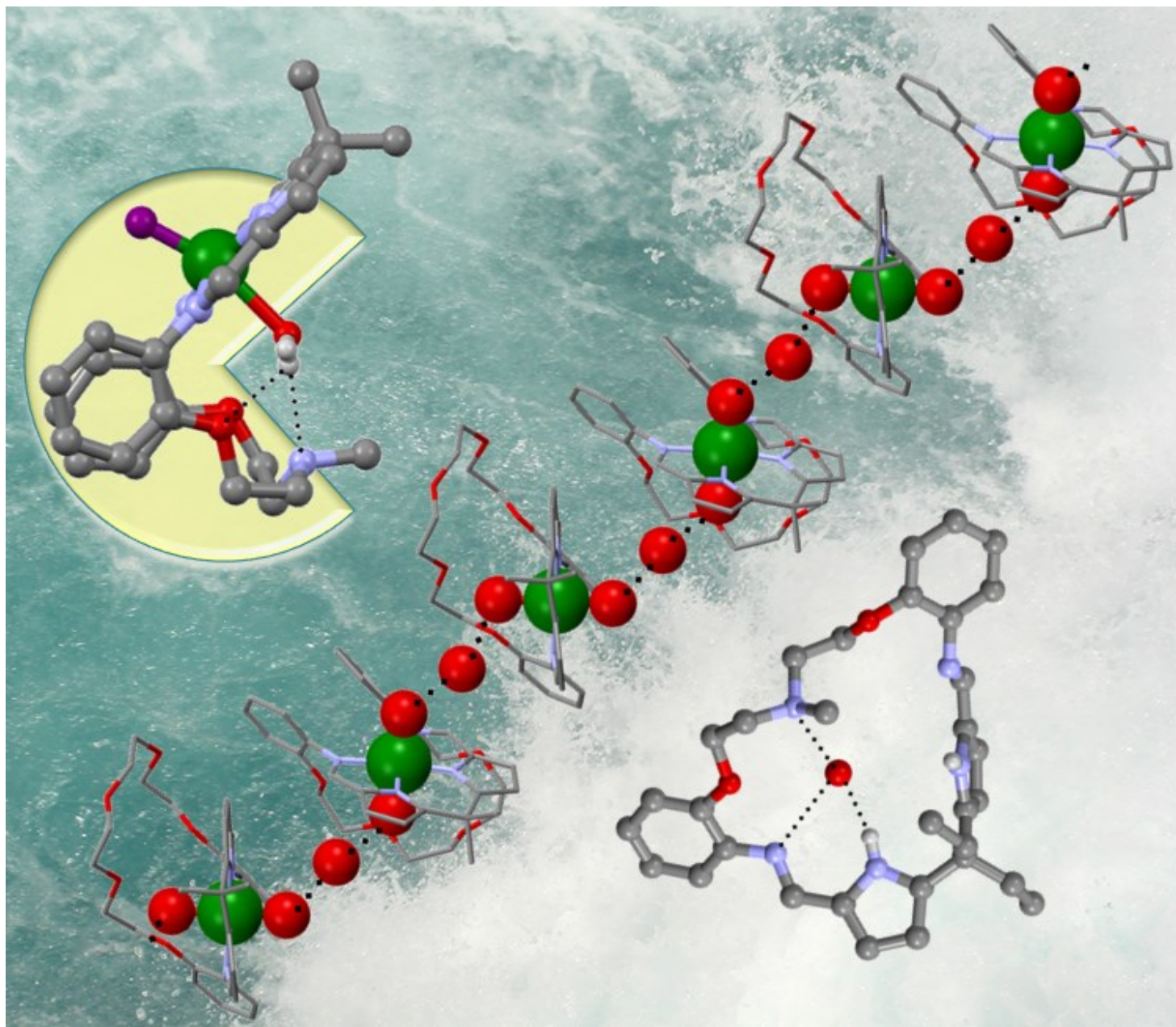
Supramolecular Chemistry – ‘Artificial’ Enzymes ...



Chemical Engineering – Industrial Chemistry / Catalysis

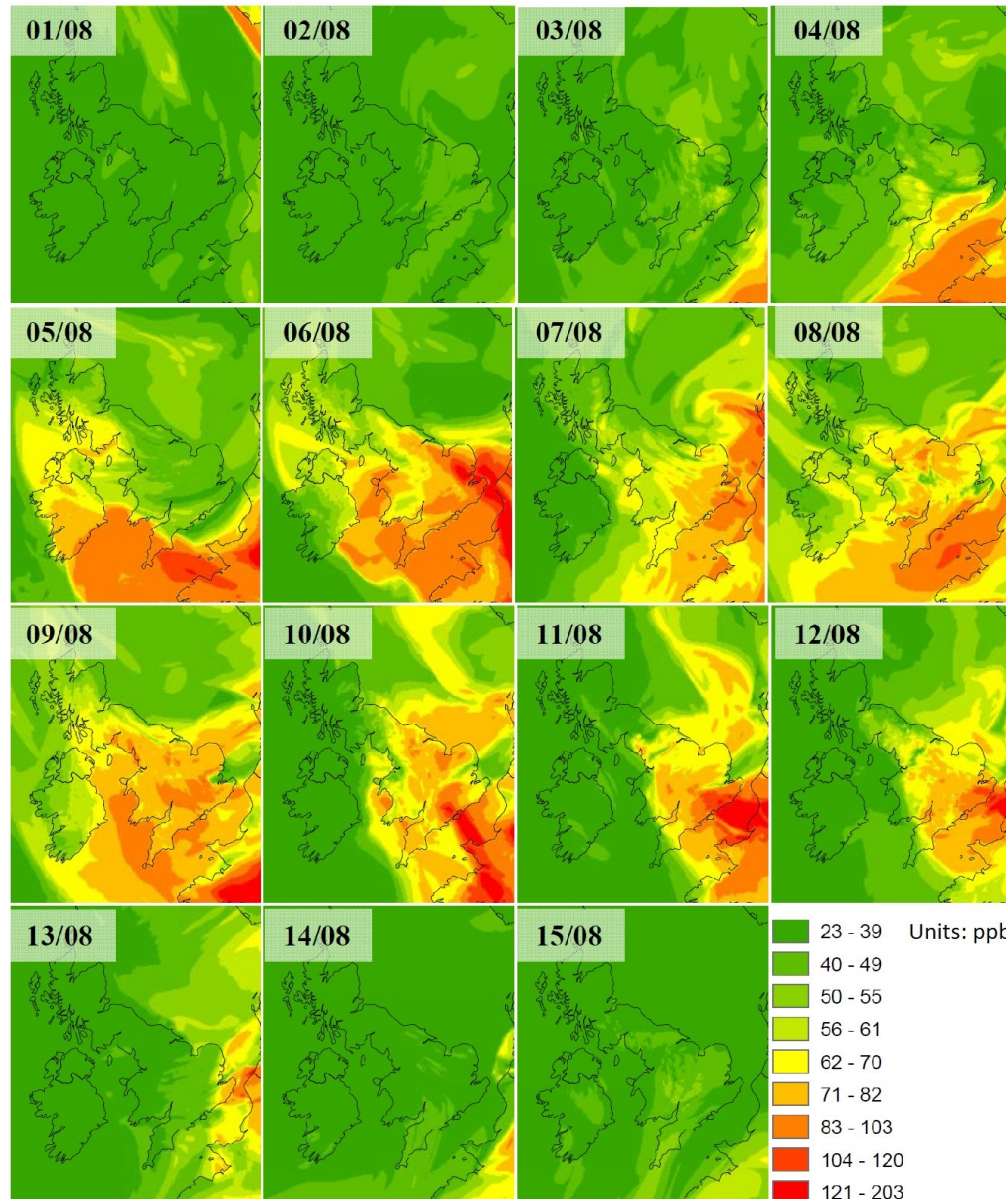


Catalysis & Environmental Chemistry – Metal Complexation



Environmental Chemistry – Measurement of Ozone (O_3) in Air

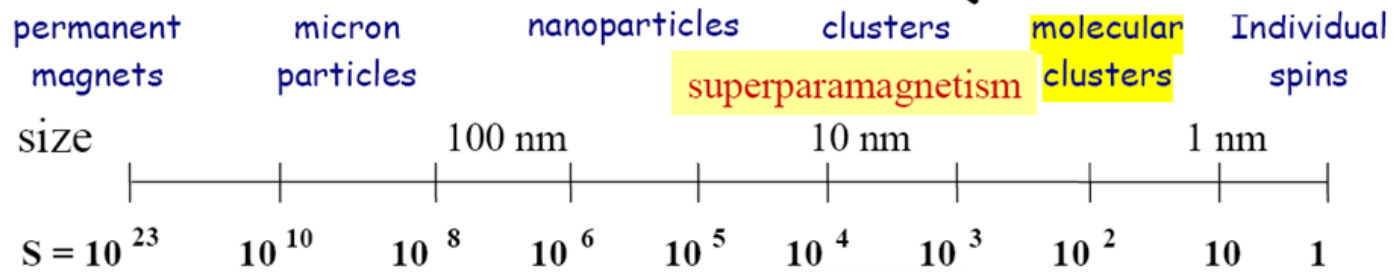
Modelled daily surface ozone concentration (ppb)



Organometallic Chemistry – Magnetic Materials ...

MESOSCOPIC MAGNETISM

Classical ←→ Quantum



information storage



biomedical applications

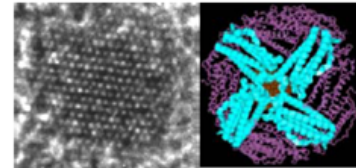
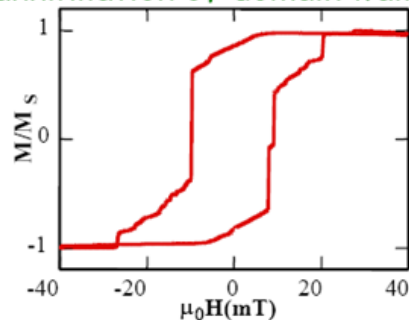


hybrid cars



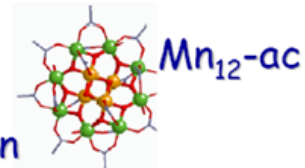
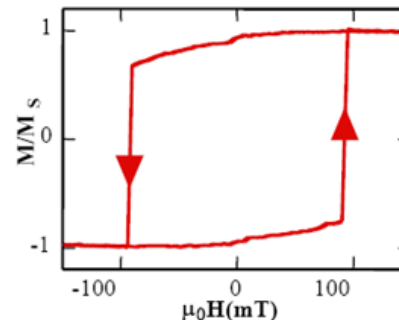
multi - domain

nucleation, propagation and annihilation of domain walls



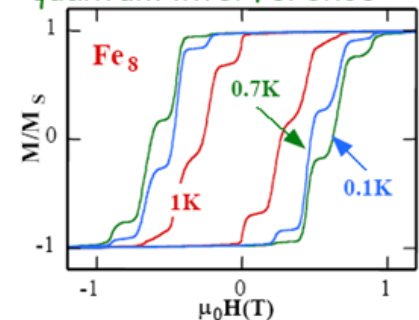
single - domain

uniform rotation

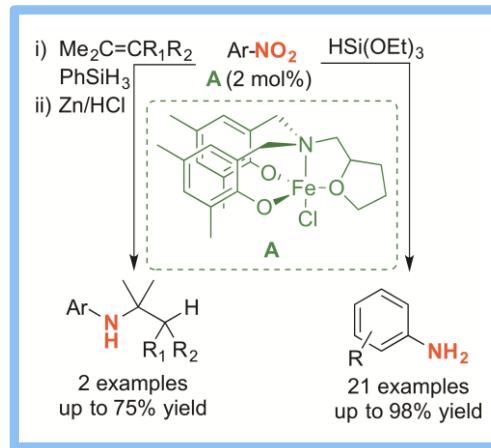
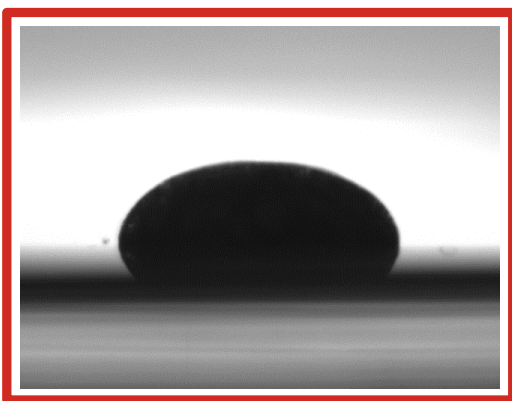
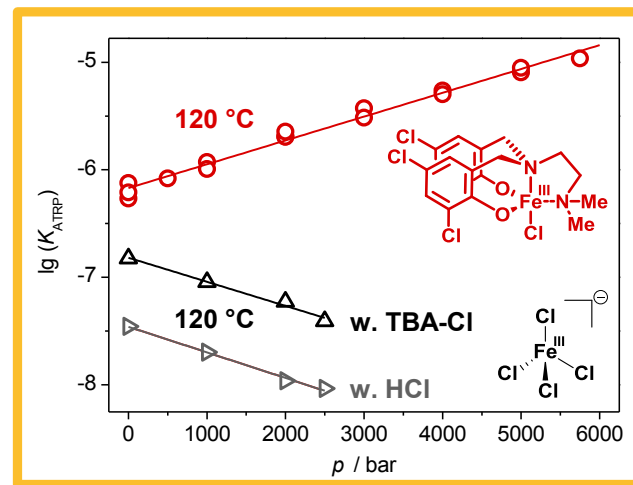
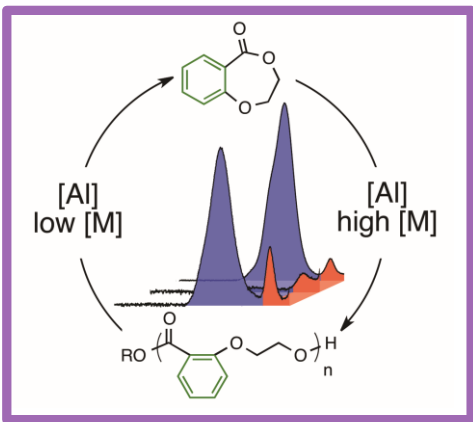
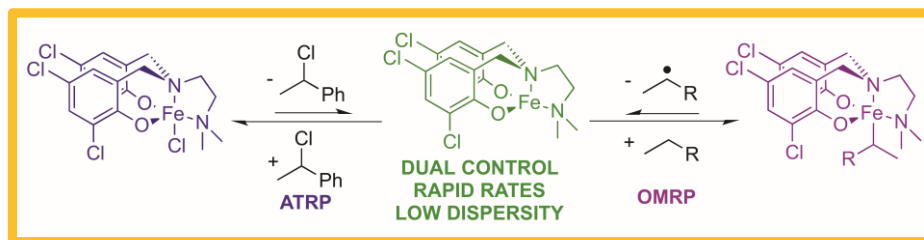
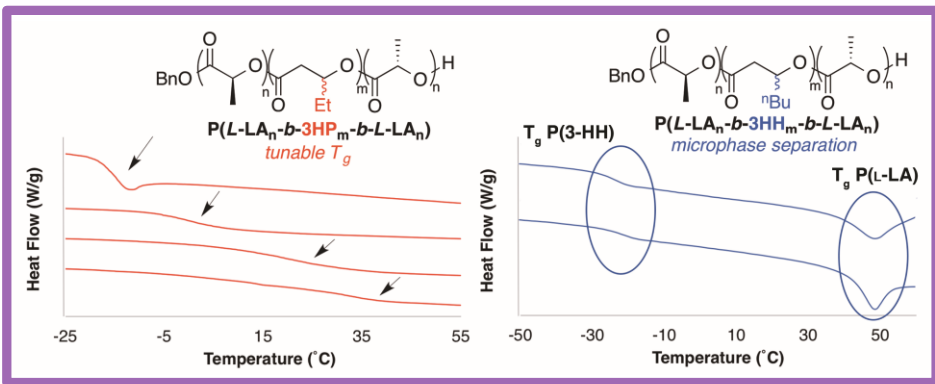


Single molecule

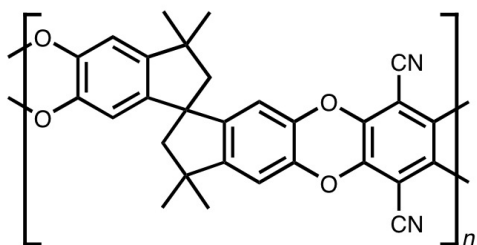
quantum tunneling, quantum interference



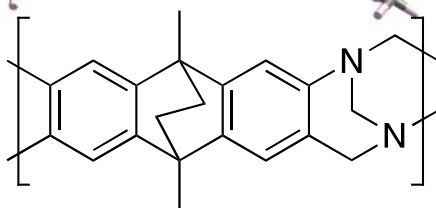
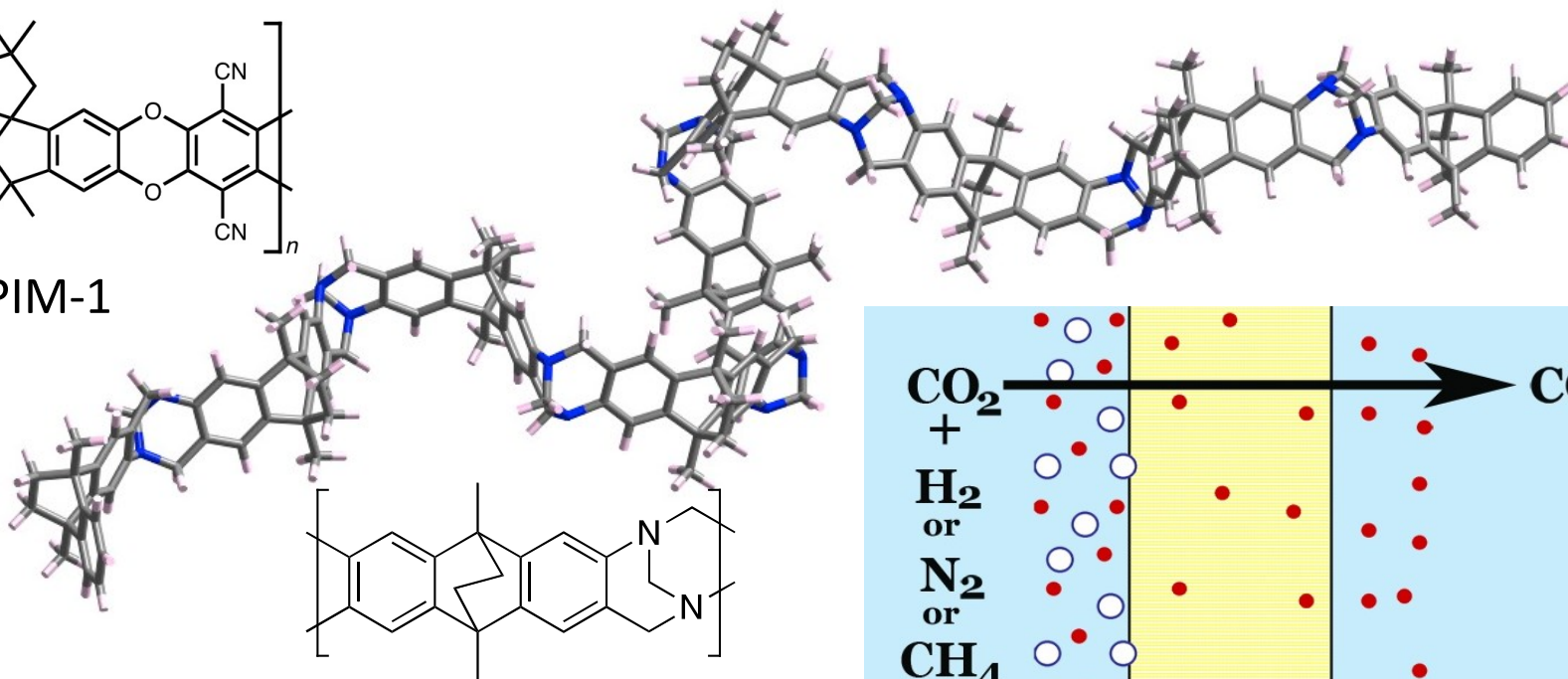
Organometallic Chemistry – Polymerization ... New Materials



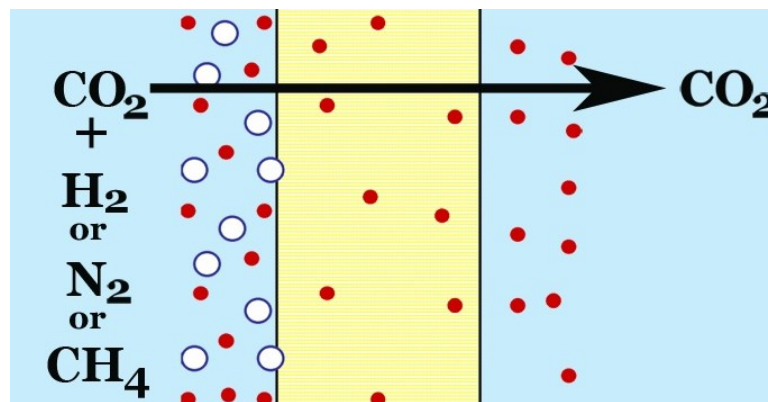
Polymeric Chemistry – Useful Plastics with Micropores



PIM-1



PIM-EA-TB



Properties:

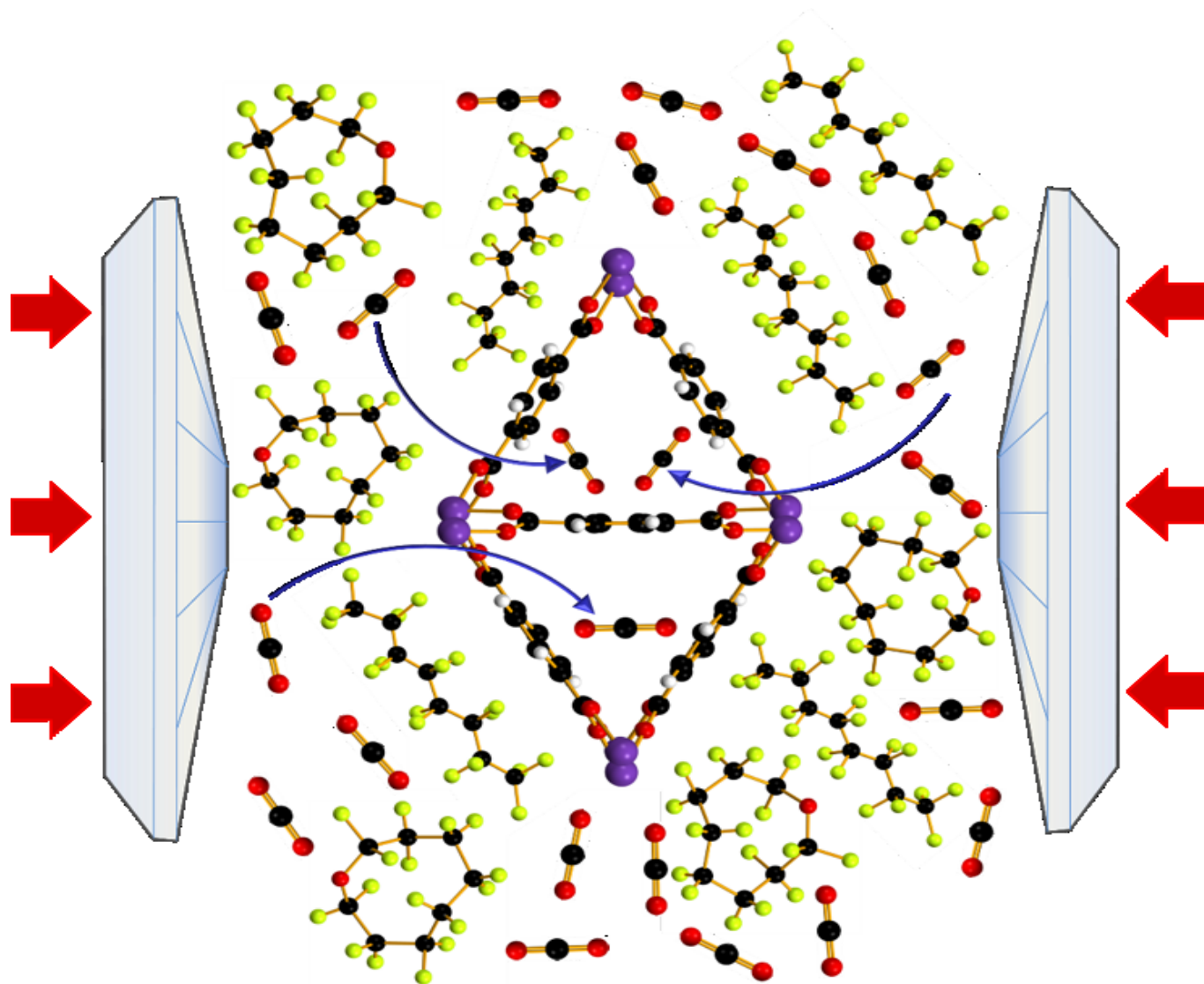
- Microporosity (i.e. permeability)
- Rigidity (i.e. selectivity)
- Solubility (i.e. processability)
- Chemical functionality

Applications:

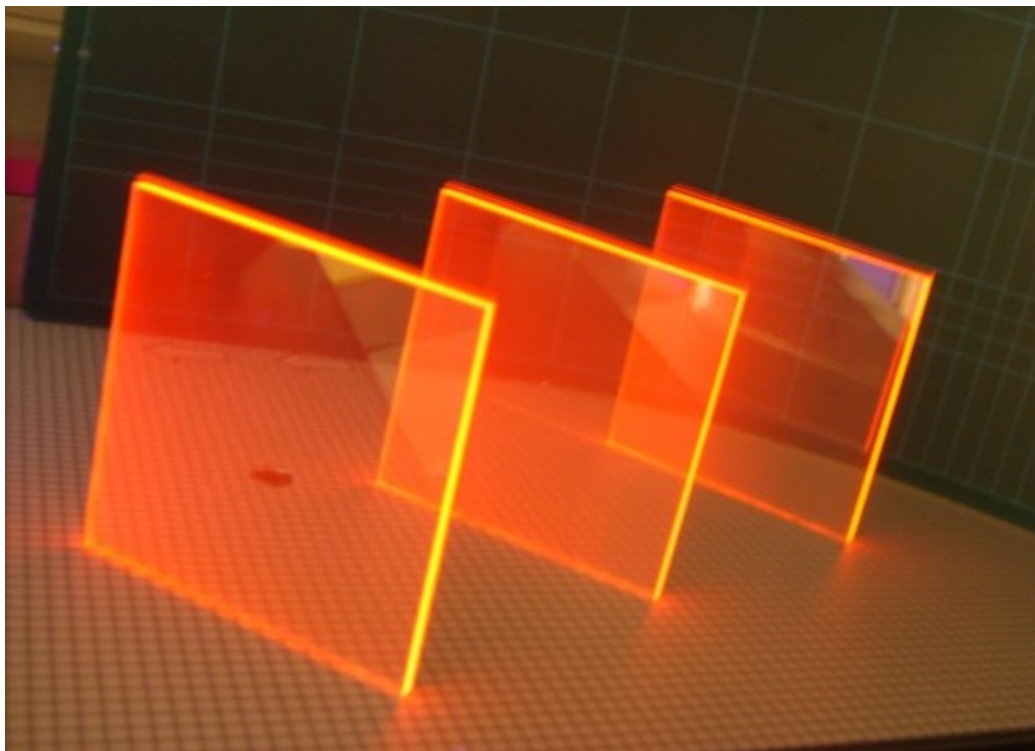
- Membranes for gas separations
- Adsorbents
- Sensors
- Catalysts



Metalorganic Frameworks (MOFs) – CO₂ Capture under Pressure



Materials Chemistry – Novel Solar Cells ...



Luminescent downshifting materials absorb light in the UV where the solar cell efficiency is low and re-emit in the red region where the solar cell efficiency is high.

Experimental Physical Chemistry: Visualization of Molecules

Molecular movies...

