



Catalysts and reaction conditions

Education in Chemistry

Sustainability in chemistry 2021

Goal 9: build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.

rsc.li/2V7IC2r

Effective research and presentation are key skills. Practise those skills while learning more about catalysts and reaction conditions in the context of sustainable industry.

Research

Research a range of industrial processes and product syntheses using the *The Essential Chemical Industry - online* – www.essentialchemicalindustry.org. Record what you have found out in a table.

- Identify whether any catalysts are involved in the industrial process or product synthesis.
- Identify the temperature and pressure conditions needed.
- Calculate the atom economy of the main reaction
- Make a note any other points of interest.

Suggestions:

Possible products to investigate include ammonia, chlorine, hydrogen, nitric acid, sodium hydroxide and sulfuric acid. Processes that you could research include cracking/refinery, distillation and fracking.

Evaluate

How will you evaluate your presentation? Ask yourself the following questions – then deliver your presentation and ask your audience the same questions.

- Is the overall message of the presentation clear? Can you summarise it in a couple of sentences?
- Is the chemistry accurate and accessible?
- Is context used to enhance the chemistry or is it distracting?
- Are information sources clearly cited?

Present

Produce a presentation of your research in one of the following formats:

- a short verbal presentation (5 minutes),
- a poster to present in a poster session,
- a digital presentation.

Reflect

What have you learnt from this activity? Consider the following questions and set yourself a target for the next time you do a similar task.

- How efficient was I in my research? Did I stick to the task at hand, or did other work/non-work distract me?
- How well did my planning work when putting together my presentation? Did I have to go through multiple drafts?
- How did I feel during the presentation? Was I confident or apprehensive? Did I do sufficient preparation/practice beforehand? How did I regulate my emotions during the stress of presentation?
- What key target will I set myself to improve my work process next time I have a similar task?



Industrial process/product	Catalyst(s) involved	Temperature and pressure	Atom economy	Other information
<i>Example: ammonia</i>	<i>Iron oxide (Fe_3O_4) which is reduced to Fe by the hydrogen reactant</i>	<i>600–700 K, 100–200 atm</i>	<i>100%</i>	<i>Ruthenium coated on graphite is a potentially more useful catalyst</i>

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