

CHEMICAL SYNTHESIS



Green Chemistry

The principles developed by chemists and the chemical industry to enact a more sustainable industry. The commonly accepted principles of green chemistry include:

- ▶ Prevention – preventing waste is easier than cleaning it up.
- ▶ Atom economy – maximise the incorporation of all materials used during the process into the final product.
- ▶ Less hazardous chemical synthesis – generating little or no toxic products or by-products.
- ▶ Designing safer chemicals – chemical products designed to affect their desired function only.

- ▶ Safer solvents and auxiliaries – these should be made unnecessary wherever possible and innocuous.
- ▶ Design for energy efficiency – energy requirements should be minimised.
- ▶ Use of renewable feedstocks – raw materials should be renewable.
- ▶ Reduce derivatives – keep process as simple as possible.
- ▶ Catalysis – as selective as possible (preferable to stoichiometric reagents).
- ▶ Design for degradation – products breakdown safely at the end of their use.
- ▶ Real-time analysis for pollution prevention – minimise pollution and hazardous substances.
- ▶ Inherently safer chemistry for accident prevention – process chosen to minimize the potential for accidents.