Chemistry 20

Unit D: Quantities in chemical change

Stoichiometry in industry and the lab

Leftover feed is a cost

- A plant that pours a large excess of one reactant pays for material that ends up as leftover reactant.
- A higher percent of the calculated product collected means less of that feed was lost to an unfinished change or a side path.

Yield and by-products

- Industry uses stoichiometry to cut leftover reactant and to raise the percent of product collected.
- A lab plan names a concentration method, a predicted equivalence point, an indicator, and the WHMIS step.

Key terms

by-product

A second product, such as $SO_2(g)$ or carbon dioxide from a fuel, that still needs a risk and disposal decision. ($SO_2(g)$)

percent error

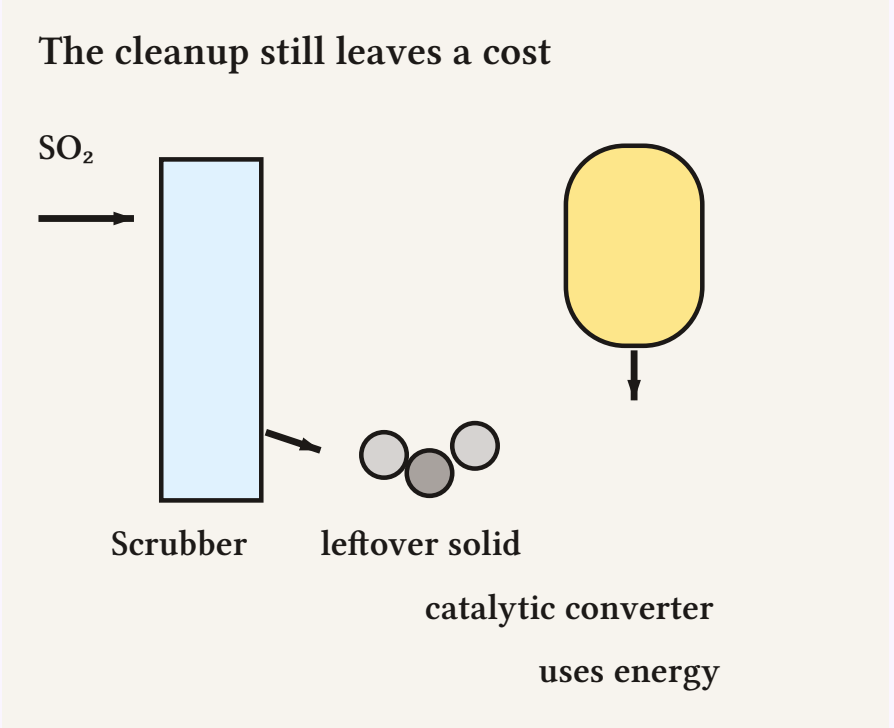
The positive difference between the measured mass and the theoretical mass, divided by the theoretical mass, times 100. (15.0%)

standard solution

A solution whose concentration is known well enough to find another concentration by titration. (0.100 $mol \cdot L^{-1}$ HCl)

Controls that still leave a cost

- A smokestack scrubber lowers $SO_2(g)$, and a catalytic converter lowers CO and NOx in exhaust.
- Each control meets an emission need and still carries a residue or an energy cost.



85.0 percent collected, 15.0 percent off

- The theoretical mass is 5.00 g and the collected mass is 4.25 g.
- Percent yield and percent error use those two masses in different fractions.

Titration plan

- A 25.00 mL acid sample near 0.100 mol·L^{-1} is expected to need about 25 mL of a base near 0.1 mol·L^{-1}.
- Bromothymol blue is the planned indicator, and a pH probe can log the curve.

A precipitate mass and two group results

- A dried precipitate mass can be turned into a solution concentration.
- Two groups can report different base concentrations, and both results stay in the shared table.