

DEMONSTRATIONS

Cobalt Pink and Blue

What is happening?

The blue solution we initially see is cobalt (2+) chloride in a solution of pure ethanol. The cobalt (2+) ion appears blue and the ethanol molecules are arranged around it. When water is added, the water weakly binds around the cobalt ions, giving it a different arrangement. This makes the cobalt ion pink.

Did you know?

Cobalt and other metals in the middle of the periodic table are important in biology because they can have different amounts of positive charge, and can make different numbers of chemical bonds. In your body, *iron* is the metal that carries oxygen in your blood from your lungs to your muscles. Cobalt is used to help your body make blood cells. You only have a very small amount of cobalt in your body but without it you would die.

'Traffic Light' and the 'Blue Bottle' reactions

What is happening?

Each bottle contains glucose and a dye in a sodium hydroxide solution. Shaking the bottle causes oxygen in the air to react (oxidise) with the dye.

Indigo carmine: (yellow) + oxygen → (red) + more oxygen → (green)

Methylene blue: (colourless) + oxygen → (blue)

However, when the oxygen runs out, the reaction reverses, and the solutions return to the original colour. Shaking the bottles re-introduces oxygen.

Did you know?

Indigo carmine is used as a food colouring and a pH indicator. Doctors also use it to study kidney and bladder function - they inject the dye into the bloodstream and see how long it takes for the urine to turn green!