

Separation by sieving

Material processes Separating mixtures Separation by sieving

Investigation

Sieves

You've probably seen a sieve being used in the kitchen. Sieves come in different shapes and sizes, but they all have one thing in common: holes. These holes are used to separate solids of different sizes. The smallest types of sieve are used in chemistry laboratories and the petroleum industry. These are called **molecular sieves**.

Molecular sieves

So what are molecular sieves? Do they work in the same way as kitchen sieves? A molecular sieve is a material with very small holes of a precise size. These holes are small enough to block large molecules but allow smaller molecules to pass through. So molecular sieves work on the same principle as sieves used in the kitchen, but on a much smaller scale.

What are they for?

Molecular sieves are used as an **adsorbent**, which can dry gases and liquids by separating molecules according to their sizes and shapes. Be careful not to confuse **adsorption** with **absorption** – they are two different things. **Absorption** means to take some thing in. For example, during digestion nutrients from food are absorbed into the bloodstream through the small intestine. **Adsorption** on the other hand, means to accumulate on the surface of a solid or liquid. In the molecular sieve, the smaller molecules are **adsorbed**. They are trapped in the tiny holes in the sieve's surface. The larger molecules are not adsorbed. Molecular sieves are often used in the petroleum industry, where they are used to purify gas streams. In chemistry laboratories, molecular sieves separate compounds that are made up of two or more different elements.

Silica gel

You might already have come across one type of molecular sieve called **silica gel**. You will often find a sachet of silica gel inside a new bag or purse, or in a new electronic product's packaging. Silica gel traps water vapour, eliminating moisture that could damage the product. It contains millions of tiny pores that can adsorb and hold up to 40% of its weight in moisture.

