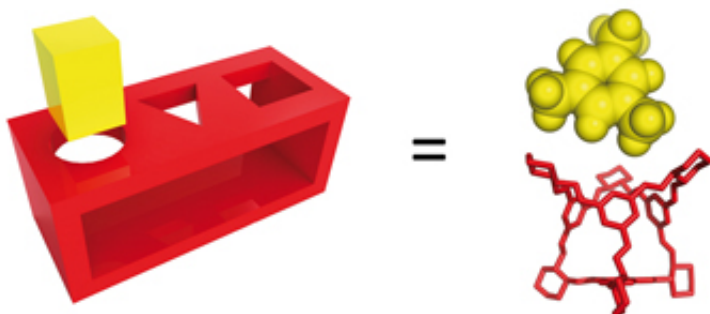


# New technique developed to separate complex molecular mixtures

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Professor Cooper: “The holes in these cage molecules act like a shape-selective molecular sieve, rather like a children’s wooden shape puzzle”

Chemists at the University of Liverpool have created a new technique that could be used in industry to separate complex organic chemical mixtures.

Chemical feedstocks containing [benzene](#) are used extensively in industry to create modern materials and polymers.

## Distillation techniques

Their use relies heavily on distillation techniques which separate complex mixtures into more simple molecules used as building blocks to develop drugs, plastics and new materials. These [distillation](#) techniques

can be expensive and involve large amounts of energy for hard-to-separate mixtures.

A team of researchers at the University's Department of Chemistry, led by Professor Andrew Cooper, have created organic molecular crystals that are able to separate important organic [aromatic molecules](#) by their molecular shape.

Professor Cooper said: "We were able to demonstrate this new molecule separation technique by synthesising porous organic cage molecules that are highly similar in shape to the molecules that need to be separated.

## "Flexibility and motion"

"The holes in these cage molecules act like a shape-selective molecular sieve, rather like a children's wooden shape puzzle. Using computer simulations we revealed how the porous cages separate the aromatic feedstocks and show that, unlike a wooden shape puzzle, the mechanism actually involves flexibility and motion in the cage sieves. "

The ability to separate complex molecules using less energy will be important in the future for current petrochemical and chemical industries and for producing any next-generation sustainable bio-derived chemicals.

The findings are part of a five-year research programme in new materials discovery, and are published in *Nature Chemistry*.

**More information:** [www.nature.com/nchem/journal/v...full/nchem.1550.html](http://www.nature.com/nchem/journal/v...full/nchem.1550.html)

Provided by University of Liverpool

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