species adsorbed onto aerosol particles is of interest because these processes can have an impact on the chemical composition of the atmosphere and the propensity of aerosols to promote cloud formation. A specific example of this is the ozonolysis of carbon–carbon double bonds, which are widespread in biosurfactants and terpenes found in the atmosphere, but there have been few studies on the effect of their stereochemistry.

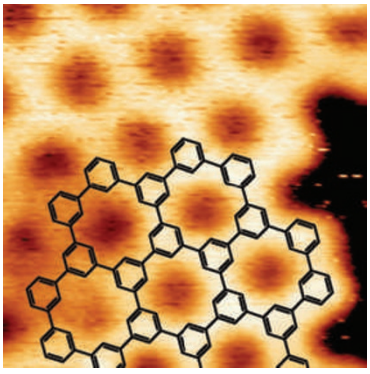
Now, Franz Geiger and colleagues at Northwestern University in Illinois have shown that the propensity of a chiral alkene adsorbed on an aerosol particle to undergo ozonolysis may depend on its orientation on the surface and hence its stereochemistry. The differences in chemical accessibility would then lead to the enrichment of one stereoisomer of the product over the other.

As a model for atmospheric aerosol particles, the researchers prepared silicate substrates functionalized with diastereomeric alkenes. Kinetic studies of the ozonolysis reaction showed that the diastereomer with the alkene group oriented towards the gas phase reacts twice as fast as the one oriented away from it. This finding could lead to the use of chiral organic molecules as 'markers' to distinguish between anthropogenic and biogenic sources of certain organic carbon emissions.

2D MATERIALS

Porous graphene

Chem. Commun. doi:10.1039/b915190g (2009)



The unusual electronic properties of graphene have generated great interest in research into other two-dimensional (2D) materials. Furthermore, introducing pores with controlled size and distribution could be a way of tuning these electronic properties. Although 2D supramolecular assemblies have been prepared, the relatively weak interactions mean that the resulting materials have not been thermally or chemically stable enough to be useful.

Now, Marco Bieri and Roman Fasel of the Swiss Federal Laboratories for Materials Testing and Research and co-workers have reported the synthesis of the first 2D polymer with a controlled pore structure. Described as a 'porous graphene', it is assembled on a silver surface by polymerizing a macrocycle of six phenyl rings joined at their *meta*-positions, the silver promoting the coupling of the rings at 570 K to form a large sheet.

The resulting polymer could be annealed at 805 K, and was stable up to the temperature at which the silver surface deformed. Its structure was examined using scanning tunnelling microscopy and was found to resemble graphene with periodically 'missing' phenyl rings. The team hopes that this will open up a class of graphene-related functional materials with tunable electronic properties.

ZEOLITES

Slimmed-down catalysts

Nature **461,** 246–249 (2009)

Zeolites owe their widespread use as industrial catalysts to their uniform micropores. It is the small size of these pores, however, that often hampers their performance because substrate molecules are slow to diffuse to the active site. One way to overcome this is to make thinner and thinner zeolite crystals, making more micropores accessible.

Now, a team led by Ryong Ryoo of KAIST in Korea have made sheets from the zeolite MFI that are only as thick as one unit cell — around 2 nm. They designed a diquaternary ammonium surfactant to act as the structure-directing agent: the head group templates the zeolite structure and the long alkyl chain prevents the zeolite from forming in three dimensions. Altering the concentration of sodium ions in the synthesis mixture controls whether a multi- or unilamellar structure is obtained.

Both forms of the nanosheets outperform bulk MFI as a catalyst in a range of reactions — which was expected because of the availability of the pores — but they also have a longer lifetime as an effective catalyst. Ryoo and colleagues attribute this to coke formation being slower for the nanosheets than for the conventional MFI, and to it forming only on the exterior surface of the nanosheets, whereas in other MFIs it forms inside the pores, covering the active sites and even blocking the pores.

The definitive versions of these Research Highlights first appeared on the *Nature Chemistry* website, along with other articles that will not appear in print. If citing these articles, please refer to the web version.

blogroll

Lead plays the copper

The useful tools of lab life, a link between kindergarten and crystallography and nanoparticles turn 'tec'.

"If you had to list 5 items that you would buy for yourself in the lab, what would they be?" Chemjobber (http://chemjobber.blogspot.com/) posed this question about the things "worth buying for your personal happiness" on The Chemistry Blog (http://go.nature.com/7GO1Wd). His own lab must-haves included a multitool, a permanent marker and "a nice pen — writing in your notebook should be a pleasure". The commenters on the post suggested additions ranging from pipette bulbs and tweezers to music and nice colleagues! Regular contributor Noel made the important point that it can be difficult "to find the right safety goggles for Asian people". She continued "We have slightly shallower facial features, making it very hard to wear anything that doesn't have the nosepiece."

Jyllian Kemsley marked her daughter starting kindergarten with a post at C&ENtral Science (http://go.nature.com/kaAZQs) linking the origins of kindergarten to crystallography. The man credited with inventing kindergarten is Friedrich Fröbel, who "spent two years cataloguing crystals for Christian Samuel Weiss, learning an early crystal classification system based on the axial intercepts of developed facets". These are essentially the reciprocals of the Miller indices we use today, and Weiss is credited (at least in Wikipedia) as one of the founders of modern crystallography. Kemsley lists the toys that Fröbel directed children to play with, which sound almost guaranteed to drive children towards patterns, symmetry and all things crystallographic.

And finally ... potential lead thieves, beware nanotechnology! Matt Wilkinson on the Chemistry World blog (http://go.nature.com/udWbWo) reported that Kent Police in the UK secured the conviction of "three men who pleaded guilty to stealing lead from the roof of a church". Little did these felons know that the roof had been painted with a nanoparticle-based paint that fluoresced under UV light, identifying the origin of the purloined metal.