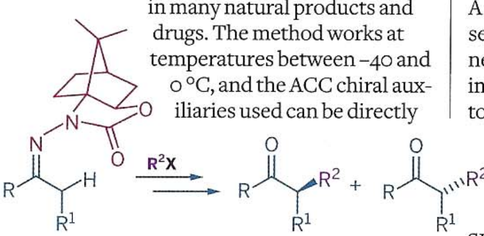
proteases, then "drug-screening efforts should not just seek compounds that bind to proteases themselves, but also those that bind to their substrates," Kodadek adds.

NEW ROUTE TO α-ALKYLATED KETONES

A new method for asymmetrically α-alkylating ketones—adding alkyl substituents to carbons adjacent to ketone groups to give chiral products—is simpler and more amenable to scale-up than current approaches, according to Duke University's Daniel Lim and Don M. Coltart, the researchers who devised the procedure (*Angew. Chem. Int. Ed.*, DOI: 10.1002/anie.200800848). In the reaction, a ketone is combined with a chiral N-amino cyclic carbamate (ACC, red) to generate a hydrazone, which is then alkylated by an alkyl halide (purple) to yield chiral products and the original ACC. This approach also makes it possible for the first time to α,α-bisalkylate ketones asymmetrically. The technique could prove useful for modifying and synthesizing alkylated ketone structures found in many natural products and drugs. The method works at temperatures between –40 and 0 °C, and the ACC chiral auxiliaries used can be directly recycled to save costs. Both of these factors make scale-up more practical. In previous asymmetric ketone α-alkylations, colder reaction temperatures (–110 to –78 °C) were required and the chiral auxiliaries used were more difficult to recycle.



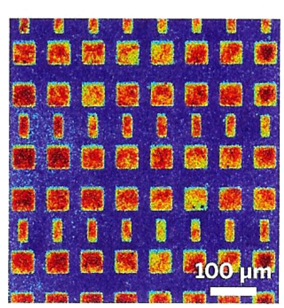
REPLENISHED OZONE COULD AFFECT SOUTHERN HEMISPHERE WINDS

Earth's healing ozone layer may have unexpected effects on the climate of the Southern Hemisphere, researchers predict (*Science* **2008**, *320*, 1486). An international team headed by Columbia University's Seok-Woo Son used the Chemistry Climate Model Validation (CCMVal) system to forecast that the Westerly Jet, a wind current that races around the Southern Hemisphere during the summer, may ultimately slow down as the ozone layer continues to regenerate through the middle of this century. The CCMVal model predicts that deceleration of the Westerly Jet would lead to an increase in ocean surface temperatures and a decrease in sea ice, as well as altered ocean circulation patterns. This scenario runs counter to the general improvement in climate conditions predicted by the most recent assessment issued by the Intergovernmental Panel on Climate Change (IPCC). Son and coworkers attribute the significant differences between the CCMVal and IPCC models to the "fully interactive stratospheric chemistry" of CCMVal, which permits it to account for how increasing ozone levels could affect the atmosphere. The study demonstrates that developing more accurate computer models is essential in predicting and understanding the outcomes of complicated phenomena such as climate change, the researchers note.

SPR IMAGING WITH WHITE LIGHT

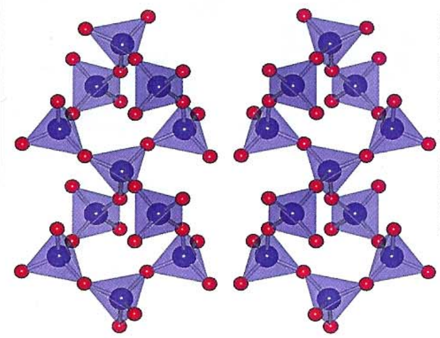
A new surface plasmon resonance (SPR) sensor that is optimized for visible and near-infrared wavelengths could make SPR imaging cheaper and easier to use, according to a study led by chemistry professor Ralph G. Nuzzo and materials science professor John A. Rogers of the University of Illinois, Urbana-Champaign (*Angew. Chem. Int. Ed.*, DOI: 10.1002/anie.200800501). In SPR, polarized light strikes a layer of metal at the interface between media with different refractive indexes, exciting electromagnetic waves called surface plasmons that are sensitive to changes at the interface. The researchers devised an SPR crystal made of an array of gold-coated nanowells. The new device, which is more sensitive at visible and near-IR wavelengths than previous SPR sensors, depends on the diameter, depth, and spacing of the wells and on the thickness of the gold layer. The researchers tested it by using white-light illumination to image 1-octadecanethiol monolayers on the sensor surface. The improved performance in the visible and near-IR spectral regions suggests that such SPR optics could be used with standard laboratory optical microscopes and low-cost charge-coupled device cameras.

1-Octadecanethiol squares and rectangles imaged on an SPR sensor.



COURTESY OF RALPH NUZZO

X-RAYS DISCERN CRYSTAL ENANTIOMERS



ADAPTED FROM *PHYS. REV. LETT.*

The left- and right-handed views of quartz (SiO_2) crystals.

Conventional X-ray crystallography can identify structures of enantiomers, but it can't distinguish between right- and left-handed crystals. Now, a group led by Yoshikazu Tanaka of the Japanese research institute RIKEN has used circularly polarized synchrotron X-ray beams to elucidate the handedness of crystals (*Phys. Rev. Lett.* **2008,** *100,* 145502). Other techniques to identify crystal chirality typically require either having the crystal interact with another chiral material or slicing or mounting a crystal to view it in a microscope. The researchers used the polarized X-ray technique, called resonant Bragg diffraction, to study two enantiomers of quartz and found that the two crystal types reflect different X-ray intensities depending on right- or left-circular polarization. The approach could be a useful screening tool for applications that require a chiral environment such as biomolecular interactions or selective reflection by liquid crystals in optical applications. "While this synchrotron-based technique may not have many immediate practical applications, Tanaka and coworkers have demonstrated a new and supremely elegant process for characterizing chiral materials," says research scientist Robert M. Hazen of Carnegie Institution for Science, Washington, D.C.