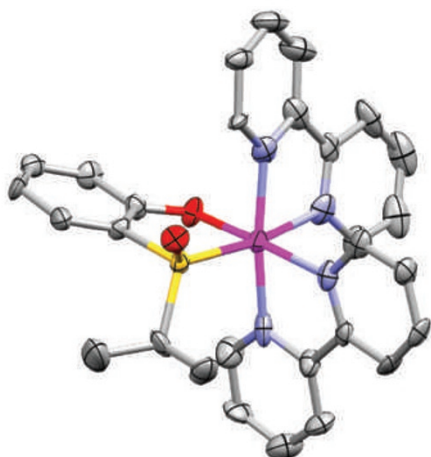


oxide and carbon monoxide. The first catalyst — a cationic aluminium complex — mediates the epoxide carbonylation to form the  $\beta$ -butyrolactone, and the second — a zinc alkoxide species — effects the polymerization *in situ*. On paper, this sounds like an obvious step, but in practice it requires that the two catalysts do not interfere with one another and are suitably reactive under the same conditions. Dunn and Coates were able to show that their pair of catalysts had essentially orthogonal reactivity — each one doing only its own job — and ultimately identified conditions that allowed production of a high-molecular-weight, low-polydispersity product with low catalyst loadings.

#### COORDINATION CHEMISTRY

### Stereoselective sulfoxide

*Angew. Chem. Int. Ed.* doi:10.1002/anie.201003139 (2010)



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Asymmetric catalysis very often involves a metal centre coordinated with a chiral ligand. The resulting chiral complex can then be used to catalyse the selective formation of a chiral organic product. Coordination compounds can, however, be 'chiral-at-metal', in which the coordination geometry of achiral ligands still results in the formation of a chiral complex. Such complexes can be equally useful in asymmetric catalysis applications, but methods for their selective formation are rare. Now, Eric Meggers and co-workers, from Philipps-Universität Marburg in Germany, have developed a method that uses a chiral sulfoxide to catalyse the selective formation of a ruthenium complex.

Meggers and co-workers started with an achiral ruthenium complex,  $trans\text{-}[\text{Ru}(\text{bpy})_2(\text{MeCN})_2]^{2+}$ . They envisaged that an exchange of the two acetonitrile (MeCN) ligands with a chelating ligand would require an isomerization of the bipyridine

(bpy) coordination. The use of a chiral sulfoxide ligand to do this means that the isomerization happens in a stereoselective fashion to result in a diastereomerically enriched — one stereocentre at the sulfoxide, and one at the ruthenium — coordination complex. Next, by adding further bipyridine and acid, the sulfoxide ligand could be removed. This exchange occurs without any isomerization and produces a chiral complex with a single stereocentre at the ruthenium atom.

Finally, reaction conditions were identified that allowed the use of a catalytic quantity (20 mol%) of the chiral sulfoxide. The process therefore uses a small organic molecule to catalyse the formation of a chiral octahedral complex — the opposite of the typical situation seen in asymmetric catalysis.

#### BIOINSPIRED MATERIALS

### Flexible magnetic aerogels

*Nature Nanotech.* **5**, 584–588 (2010)

Biologically inspired materials often have superior properties to those made by more conventional means. Incorporating nanostructural features — for instance, polymer–nanoparticle composites — can result in multifunctional materials. This technique has proved successful for adding optical and catalytic properties, but magnetic nanoparticles have a tendency to aggregate and thus degrade other material properties.

Now, R. T. Olsson and colleagues have made a flexible magnetic aerogel by anchoring cobalt ferrite nanoparticles on bacterial cellulose nanofibres. First, they used *Acetobacter xylinum* to grow a cellulose-based hydrogel in a solution of coconut milk and sugar. They then added aqueous metal salts to this template and converted them to cobalt ferrite by adding a base and heating to 90 °C. The dried 'nanopaper' had spinel-phase nanoparticles that were around 40–120 nm in diameter.

The aerogels had low densities — down to 15 kg m<sup>-3</sup> for ones with minimal nanoparticle loading. Unlike most aerogels, they are extremely flexible, can be bent in half and take a maximum strain of 90%. Silica-based aerogels can only take a strain of a fraction of one percent. The aerogels could be deformed by a household magnet, and even bent to pick up a drop of water.

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 original web version.

## blogroll

### Advice for all

**New faculty, graduate students and newly unemployed pharma chemists get some tips. And the blogosphere welcomes back an old stalwart.**

As the new academic year grinds to a start, a couple of bloggers have shared their wisdom with their readers. Professor in Training writes in a post titled 'If I knew then what I know now...' (<http://go.nature.com/aktQhA>) that she has been asked to talk to incoming faculty and is "wondering how much of the truth I could or should tell". The 14 points include "what the general expectations are for you in your specific position" and "be prepared to deal with politics at every turn". Wise words indeed. Ambivalent Academic meanwhile shares "everything I needed to know about grad school...but had to learn the hard way" (<http://go.nature.com/3qTvN2>). Rule number seven (of nine) is particularly striking: "Adopt a personal mantra." In Ambivalent Academic's case, this was "Yay! I don't suck!" More wise words.

For those readers who escaped from the grove of academe, the readers of Derek Lowe's *In the Pipeline* have some advice in 'If you're not a chemist - what next?' (<http://go.nature.com/NdkYVvU>). This is particularly aimed at people who have to rethink their careers in light of the recent rounds of pharmaceutical lay-offs. At the time of writing, there are 188 comments, which it must be said vary in tone from inspiring to depressing. Chemjobber used his blog (<http://go.nature.com/JrTUUo>) to provide some analysis of the responses and found that the top choices were 'computer-related work', 'business' or 'intellectual property law'.

And finally...if you've been reading chemistry blogs since ye goode olde days of pre-2008 you are probably aware of ChemBark. In Paul Bracher's own words "'something' happened and ChemBark went on indefinite hiatus." But now it's back (<http://go.nature.com/cyKNGW>). And Bracher's making up for lost time, with at least 12 posts in the first two weeks, covering the grammar of 'postdocking', shopping around for disposable gloves and the inevitable Nobel Prize speculation.