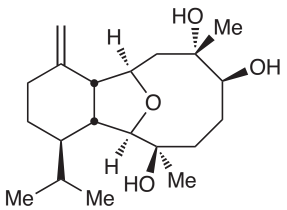
triazole — 1,4-*bis*(4-hydroxyphenyl)-1,2,3-triazole — which they condensed with a diacid chloride to produce a triazole-containing polyester. This first polymer was poorly soluble in common solvents, however, which hampered many of the standard characterization techniques and would make the polymers difficult to process.

Thermal characterization was more promising, showing that the polymers could be classified as being of ultralow flammability. A small change in the phenol substitution pattern of the monomer — to 1,4-*bis*(3-hydroxyphenyl)-1,2,3-triazole — followed by a similar polymerization produced a polymer with markedly improved solubility while retaining and even improving the flammability characteristics.

MARINE NATURAL PRODUCTS

Stereoconvergent solution

J. Am. Chem. Soc. **132,** 16380–16382 (2010)



Sclerophytin A

(–)-Sclerophytin A is a member of a family of oxygenated diterpene natural products and was first isolated from a marine soft coral *Sclerophytum capitalis*. Interest in the compound is because of both its unusual structure and its biological activity — with a concentration of just 1 ng ml^{-1} it kills mouse leukaemia cells. Now, James Morken and co-workers from Boston College, USA, have developed a total synthesis of (–)-sclerophytin A that relies on an intriguing stereoconvergent epoxide hydrolysis.

Morken and co-workers picked this target molecule to showcase the utility of their previously reported methodology for the formation of furans — a stereoselective Oshima–Utimoto reaction. This step involves the palladium-catalysed coupling of an allylic alcohol with a vinyl ether to form one of the two cyclic ethers of the product. A radical cyclization then installs the second of three rings and, after functionalization with an alkenyl chain, ring-closing metathesis produces the tricyclic core of the natural product. Conversion to the natural product required a stereoselective epoxidation and ring opening. The necessary epoxidation gave only limited selectivity, but a surprising solution meant that this was not a problem: base-catalysed ring-opening of the epoxide was highly selective and only effected ring opening of one epoxide diastereomer. Furthermore, a Lewis-acid-catalysed ring opening of the other epoxide diastereomer occurred with opposite regioselectivity and the two reactions could even be performed in one pot so that the synthesis converged on a single enantiomer, which was rapidly converted to the natural product.

'GREEN' POLYMERS

Dyeing for some colour

Angew. Chem. Int. Ed. doi:10.1002/anie.201004920 (2010)

Although the idea of making polymers from renewable feedstocks seems a very modern one in light of the contemporary concern for conserving fossil fuels, the polymer pioneer Wallace Carothers developed the synthesis of a polyester from lactic acid in 1932 while working for DuPont. Poly(lactic acid), or PLA, derives from renewable feedstocks, uses up to 50% less fossil fuel during production and is biodegradable, making it an extremely 'green' polymer. This kindness to the environment is somewhat reduced by the harsh conditions required to fix dyes to textiles made from the polymer.

Now, Patrick McGowan, from the University of Leeds, and colleagues have developed a method of directly incorporating colour into PLA itself, removing the need for subsequent harsh processing. They subtly adjusted known dye molecules — for example by incorporating a primary alcohol group — to turn them into catalyst initiators. These combined with an aluminium-based pre-catalyst to form what McGowan and co-workers propose is the actual catalyst: a dimeric aluminium alkoxide complex.

Both catalyst and initiator are eventually incorporated into the final polymer chain, so each polymer molecule has a dye functionality at one end. The team confirmed this by using a high catalyst loading to make shorter-chain oligomers that they could study more easily than full polymers. Even black PLA fibres — difficult to obtain using conventional dyes — were made by mixing yellow and purple polymers in the fibre-spinning process. The fibres retained the colour well after washing and needed a lower mass percentage of dye than traditional techniques.

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

Fast cars and guitars

Looking back at the C&EN archives and pondering science's more subtle influences.

To launch the online archive of *Chemical & Engineering News*, reaching back to the first issue in 1923, Editor-in-Chief Rudy Baum blogged about his recent attempt to track down 'Silence, Miss Carson', a 1962 review of Rachel Carson's highly influential book Silent Spring (http://go.nature.com/NsJF9s). In those pre-archive days, he had to use a fair amount of "laborious (though pleasurable) effort to find [it]", but now it's a few clicks away. Others in the chemical blogosphere used some clicks to find their mentors in the newly digitized pages. Paul Bracher on ChemBark (http://go.nature.com/cVoisn) found a 1969 cover story about his post-doc advisor Harry Gray, who is pictured strumming his guitar. Inside, Gray is described as talking "in a breezy vernacular more often associated with locker rooms than with chemistry labs" and owning two fast cars. Unfortunately for Sam at Everyday Scientist (http://go.nature.com/pUErts), the coverage of his advisor, W. E. Moerner, is less in depth/lifestyle-focused but he does unearth some choice pictures of other Stanford chemists.

Who are "the Velvet Undergounds of science"? This question was posed by Chad Orzel of Uncertain Principles (http://go.nature.com/1nEU1t), and echoed by The Curious Wavefunction (http://go.nature.com/tDaKPF). For those less au fait with the influential but commercially unsuccessful New York band, Orzel defines this as "somebody whose work was only read by a tiny number of people, but ended up being incredibly influential on those people and subsequent generations". Orzel nominates Sadi Carnot, whose book about heat in the 1820s laid "the foundations for essentially all of thermodynamics", but which "basically nobody read until after his death". Wavefunction suggests, among others, Josiah Willard Gibbs "for thermodynamics: He published his founding contributions in an obscure Connecticut journal." Both are excellent nominations (there are more in the comments on both posts), but it does beg the question 'What is it with thermodynamics?'