Wang *et al.* imaged nanographite (which could be obtained from a pencil tip); this may seem to be of only moderate interest to the biological community. However, it may be possible to stain biological samples with nanographite or other nanoparticles to yield high-resolution images. By increasing the resolution and sensitivity of the technique, even super-resolution transient absorption imaging of unstained biomedical material may become possible. This may open up very interesting opportunities and a new contrast mode for medical diagnostics.

It is exciting to see a true super-resolution method, originally developed for fluorescence imaging, now being demonstrated using transient absorption. This technique promises the possibility of super-resolution imaging of unstained samples. ❒

Rainer Heintzmann is at the Institute of Photonic Technology, Albert-Einstein Str. 9, 07745 Jena, Germany, the Institute of Physical Chemistry, Abbe Center of Photonics, Friedrich-Schiller University Jena, 07743 Jena, Germany and the Randal Division, King's College London, SE1 1UL, London, U.K.
e-mail: heintzmann@gmail.com

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Competing financial interests

The author holds a patent for nonlinear structured illumination.

ENGINEERED STRUCTURES

Photonic labyrinths

Although engineered optical structures are often fabricated by 'top-down' approaches such as focused-ion-beam lithography, 'bottom-up' techniques can be cost-effective and sometimes produce smaller, more intricate features. Now, Yadong Yin, Qiao Zhang, Michael Janner and colleagues at the University of California in the USA have used a sol–gel method to produce two-dimensional 'photonic labyrinth' structures by magnetically induced self-assembly (*Nano Lett.* **13,** 1770–1775; 2013). The team used superparamagnetic nanoparticles as building blocks to construct vertically standing two-dimensional photonic-crystal structures with the assistance of external magnetic fields. These materials are anticipated to have a wealth of potential applications that include displays, antifraud devices, membranes, molecular sieves and electrodes for supercapacitors and batteries.

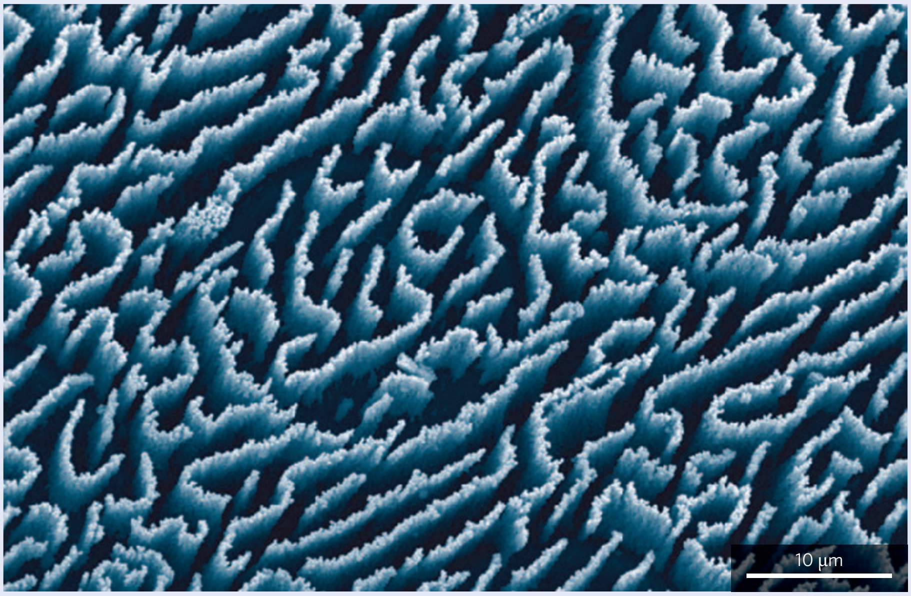
According to Yin, a two-dimensional photonic labyrinth is a sheet-like periodic structure fabricated by the self-assembly of colloidal building blocks. The dielectric contrast of the periodic structure allows light propagation to be controlled along certain directions. Yin explained that the structures may enhance our understanding of micro- and nanoscale self-assembly as well as provide platforms for designing and fabricating novel materials and devices with complex morphologies and spatial configurations.

Although the two-dimensional self-assembly of magnetic particles is not a new idea, dynamic assembly is sensitive to environmental disturbances, thus making it extremely challenging to resolve structures directly. "It would be very useful if one could capture dynamic structures without significant interruption to the original state," Yin told *Nature Photonics*. "On the other hand, the magnetic assembly approach has not been applied to the fabrication of two-dimensional photonic crystal structures, owing partly to the difficulty in fixing the dynamic structures and partly to the unavailability of monodisperse superparamagnetic colloidal building blocks with sizes comparable to the wavelength of visible light, which are needed for establishing periodic structures that function in the visible regime."

In their work, the researchers developed a magnetic assembly approach for creating photonic labyrinth structures and an *in situ* sol–gel solidification method to fix their structures without disturbing the original ordering. "Specifically, labyrinth structures are formed through the magnetic assembly of uniform superparamagnetic $\mathrm{Fe_3O_4@SiO_2}$ core–shell colloids and then glued together through an additional sol–gel silica-coating process," Yin explained. "On removing the external magnetic field, the labyrinth structure and its photonic properties are well-preserved, thus indicating that the original labyrinth structure has been maintained."

It is currently difficult to fabricate photonic labyrinth structures over wafer-scale areas owing to the limited size of the team's magnets, but Yin is confident that this could be achieved using industrial fabrication facilities that can provide uniform magnetic fields. ❒

DAVID PILE



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