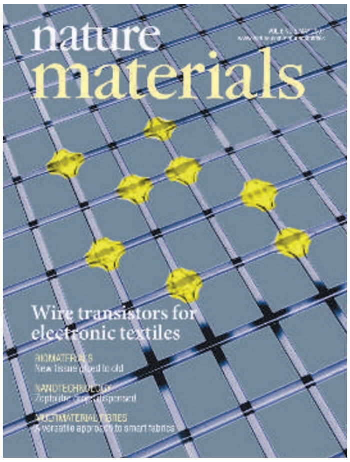

Cover story

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The incorporation of electronics in textiles should enable new interfaces between humans and technology; one of the most potent applications is in healthcare, where prevention, diagnosis and even therapy could be aided by wearable electronics. Progress is hindered, however, by the incompatibility of the requirements of precision manufacturing techniques for electronics and the imprecision of fabric processing. Inganäs and colleagues simplify this problem by using organic electrochemical transistors on fibres, which, because of their mode of operation, require less precision in their manufacture. They demonstrate logic circuits by coating fibres with conducting polymer to create electrodes, and joining them at cross-points to make transistors and resistors.
[Letter p357; News & Views p327]

BIOMATERIAL GLUE

Strategies to engineer or regenerate cartilage tissue have been bedeviled by the need to structurally integrate the implanted materials with the native cartilage. Integration is crucial for both immediate functionality and long-term performance of the tissue. Dongan Wang and colleagues achieve integration of a cell-seeded hydrogel biomaterial by laying an adhesive agent at the interface between two. This new bioadhesive is made of chondroitin sulphate (a biopolymer that is a major component components of the cartilage extracellular matrix) chemically functionalised in such a way that it can bind the proteins of existing cartilage to the materials used for tissue reconstruction or regeneration.
[**Article p385, News & Views p327**]

VORTICES HELD STILL

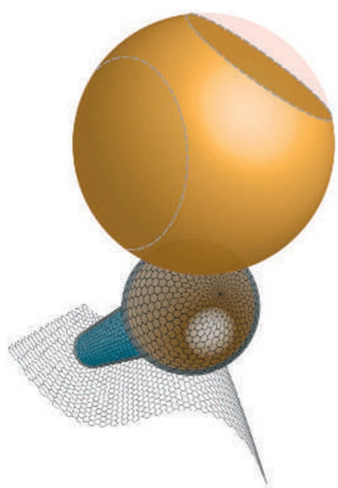
Materials scientists have been working hard to find an efficient way of introducing the right type and the right amount of dirt to pin magnetic vortices in high-temperature superconductors (HTSs) and improve the conditions for applications. Xavier Obradors and colleagues demonstrate that by using a low-cost chemical solution deposition technique they can introduce very effective defects in YBCO, the most promising HTS for practical use. The pinning force is only slightly dependent on the magnetic field orientation and almost three orders of magnitude stronger than in the case of NbTi, the low-temperature superconductor most widely used for applications. [**Article p367**]

FLEXIBLE SENSORS

Integrating electronic devices on flexible plastic substrates is crucial for the development of portable consumer electronics. However, as most plastics deform above 100 °C, methods for overcoming this temperature restriction are badly needed. James Heath and colleagues now propose a parallel and scalable process for transferring silicon nanowires onto plastic to yield ordered films for low-power devices. The printed nanowires exhibited promising performance as both field-effect transistors and as highly sensitive gas sensors capable of detecting parts-per-billion traces of NO_2 gas, a hazardous pollutant. These arrays were also capable of distinguishing between acetone and hexane vapours, making these devices promising as portable, wearable and even implantable sensors. [**Article p379**]

ZEPTOPIPETTES

Sutter and Sutter report pipettes capable of dispensing zeptolitre (10^{-21} l) droplets of gold–germanium alloy, which contain between ten thousand and a million atoms. The pipettes consist of germanium nanowires with a reservoir of alloy at one end; the whole arrangement is coated in a few layers of carbon atoms. By heating the pipette and puncturing the carbon coating around the alloy droplet using an electron beam, a zeptolitre droplet is dispensed. Observing the solidification of the droplet provides insight into crystallization in a regime too large for simple atomistic simulations, but small enough to have behaviour distinct from the macroscale. [**Letter p363**]



Dispensing zeptolitre droplets of gold–germanium alloy from a nanopipette allows crystallization in this size regime to be studied.

p363

SOLUTIONS ARE THE SOLUTION

Chalcogenide phase-change materials are they key ingredient in optical rewritable data storage media as well as in phase-change random access memories (PCRAM). At present, phase-change materials are deposited onto the substrate by sputter deposition. Expanding on recent advances in semiconductor solution-based deposition, Delia Milliron and colleagues now present a solution-based process for the deposition of phase-change materials. Solution-phase deposition offers an economic and readily scaleable process. Importantly, as the authors demonstrate, such films can be deposited onto structured substrates with high aspect ratio. This reduces the need for lithography, which is particularly useful for PCRAM applications.
[**Letter p352**]

MULTIFUNCTIONAL FIBRES

Silica fibres are most commonly used for telecommunications applications. However, such optical fibres show relatively little variety in functionality and mostly serve as passive data-transmission devices. In their review, Yoel Fink and colleagues argue that silica or polymer fibres hold great promise for a large variety of other applications. A number of metallic, semiconducting and insulating materials are compatible to the standard fibre-drawing process. In this way, fibres with active electronic elements are created at unprecedented length-scales. This could enable fabrication of a number of sensing applications, as well as logic devices and intelligent fabric. [**Review p336**]