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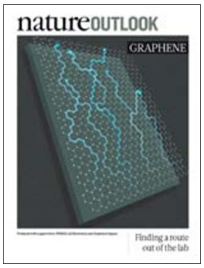

COVER ART: NIK SPENCER

Historical epochs can be defined by materials: from the Stone Age, Bronze Age, and Iron Age to the modern eras of steel and, for the last 60 years, silicon. These are the stuff that defined whole civilizations. And we may be on the threshold of a time dominated by one of the most common of all elements: carbon.

The 2010 Nobel Prize in Physics went to scientists who revealed the remarkable properties of graphene, a single layer of carbon in which the atoms are arranged in hexagons. Graphene is the latest allotrope of carbon to be under the spotlight, following from the fullerenes ('buckyballs') of the 1980s and the nanotubes of the 1990s.

Talk to some of the scientists studying graphene and they can find it hard to contain their excitement — it's as if they've been handed a new building block from which to engineer the world. Electric charge moves through graphene impossibly fast. It's extremely strong, yet flexible. Add to that its impressive optical behaviour — it's equally transparent to ultraviolet, visible and infrared light — and you whet the appetites of those developing diverse technologies, including computer chips, touch screens and solar cells (page S38). On the downside, however, it is difficult to produce graphene in pieces large enough for practical purposes (page S32).

Although graphene cannot directly replace silicon in the digital switches that comprise computers (pageS34), comparing it to silicon (page S43) is a useful analysis, and serves as a humbling reminder of how tricky it is to predict what any new material's greatest impact will be.

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Herb Brody
Supplements Editor, Nature Outlook.

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