wavefunction is stabilized by the electron–phonon interaction — the air of romance.

The superconducting isotope effect is described with a parameter α , defined by $T_c \sim M^{-\alpha}$. For superconductivity mediated by the electron–phonon interaction, T_c is set by two things: the character of the overall interaction between the electrons and the average frequency of vibration of the crystal lattice. The specific formulae that predict T_c always have the form of a vibrational frequency multiplied by some function of the interaction. As atoms in a crystal vibrate like masses on springs, the vibrational frequency is proportional to $M^{-1/2}$. In an idealized case, where the interaction is independent of M , T_c would be proportional to $M^{-1/2}$ and $\alpha = 1/2$. In actual electron–phonon-mediated superconductors, the Coulomb repulsion between electrons reduces the sensitivity of T_c to M , so that α is generally between 0.1 and 0.4. For an exotic superconductor whose mechanism does not rely on lattice vibrations at all, one would expect $\alpha = 0$. By measuring the change in T_c between $\text{Ba}_8^{28}\text{Si}_{46}$ (containing naturally abundant Si) and $\text{Ba}_8^{30}\text{Si}_{46}$ (the isotopic composition), and also measuring the shift in the phonon modes in the Raman spectra of the two compositions, Tanigaki and colleagues were able to determine that $\alpha = 0.12\text{--}0.23$ for the silicon clathrate $\text{Ba}_8\text{Si}_{46}$.

Therefore, we can now welcome the unusual covalent metal $\text{Ba}_8\text{Si}_{46}$ into the fold of classical electron–phonon-mediated superconductors. With a bit of further data analysis, Tanigaki and co-workers also extract an estimate for the strength of the electron–phonon coupling, measured by a dimensionless parameter λ . The result is $\lambda \sim 1$, comparable to the coupling strength in the higher- T_c materials magnesium diboride ($T_c \sim 40$ K) or alkali-doped fullerenes ($T_c \sim 30$ K). These boron- and carbon-based systems have higher transition temperatures, mainly because C and B are lighter than Si and thus have higher-frequency lattice vibrations. Using the new insights gained here, it may be possible to create new metallic alloys from the light main-group covalent elements — perhaps through non-equilibrium processes — to obtain even higher T_c s in new covalent metals.

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MATERIAL WITNESS

Portentous polymers

'M'ylar' does not appear in my Webster's dictionary, which is nevertheless content to include 'myristic acid'

and 'myxomycete'. My Oxford English dictionary acknowledges it ("a form of polyester resin used to make heat-resistant plastic films and sheets"), but I submit that it is not exactly a household word.

Which makes it curious that American novelist Don DeLillo sees fit to refer repeatedly to Mylar in his 1985 book *White Noise*. The neighbourhood of protagonist Jack Gladney becomes haunted by men in Mylar suits testing for toxic fallout from a chemical accident.

He didn't have to specify the Mylar. Indeed, arguably DeLillo would have made himself clearer to many readers by calling the protective clothing simply that. There is no indication of why the properties of Mylar dispose it to such a use, or even any explicit mention that it is protective.

But 'Mylar' is precisely the right choice. It gives readers the frisson of being surrounded with materials the names of which they barely know and the provenance of which they cannot guess. And the capitalization tells us that this is not merely some new word, but a trade name devised, trademarked and marketed by some big corporation. It fits with the novel's themes of alienation and disorientation in contemporary US society.

DeLillo is one of a small, influential group of American writers who insist that chemical and materials technology is one of the pervasive aspects of twentieth century life. Theirs is not the prosaic assertion that 'materials are all around us' (which of course has always been true) but that the textures, the sights and smells of modern life have typically been designed, synthesized and patented. Styrofoam, Kevlar, neoprene. If these writers are not always exactly friendly to the new substances — which often appear in ominous contexts — they do recognize and in some sense embrace them.

Thomas Pynchon's *Gravity's Rainbow* (1973) is the most remarkable fable of materials chemistry in the English language, laced with the tale of a sinister and sensual polymer called Impipolex G: "the first plastic that is actually *erectile*". Having studied engineering at Cornell before working at Boeing, Pynchon knows what he is talking about when he mentions "aromatic polyamides, polycarbonates, polyethers."

But crucially, he does not much care whether his readers know what he means by "giant heterocyclic rings" and so on: these words and phrases are talismans, half-glimpsed clues to a world of power, commerce and arcane knowledge. DeLillo too is interested not in dispelling this bewilderment but in exploring it.

A more recent initiate into this group is Richard Powers, whose 1998 novel *Gain* recounts the development of a Boston chemicals company. Again, the uncompromising details: page 171 has no text but a diagram showing the synthesis and uses of Glauber's salt.

We should be heartened by this. Patiently demystifying materials technology is one way to disseminate it. But for writers like DeLillo, Pynchon and Powers, it is already here, seamlessly embedded in our cultural experience, and we had better get used to it.

Philip Ball