

► **Scientific verification.** A research scientist at a university in New York wants to use electrophysiological measurements to verify his radioactive chloride flux measurements across membranes but does not have the expertise. An RSC scientist would either train the scientist in the technique or perform the needed measurements.

► **Industrial teach-in.** A plastics company in New Jersey wants to explore the commercial aspects of an experimental synthetic resin in the formulation of flexible plastics. An RSC scientist would study the problem and give a presentation on the findings.

► **Community teach-in.** A community on Long Island in New York wants to learn about the effects a proposed wastewater treatment plant will have on the ecology of local beaches and waterways. Or perhaps a community in Vermont is plagued with high cancer rates. Appropriate RSC scientists would study the problems and present their findings.

► **Scientific editing.** An RSC scientist could edit scientific papers or technical manuals for individuals and organizations that lack such publication experience. This service would be extremely useful for scientific authors who are not native speakers of English.

Retired scientists who are citizens or permanent residents of the US are eligible for membership in the RSC. For more information about the cooperative and its membership application process, see our website, <http://www.retiredscientists.org>.

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Some elements go cubic under pressure

In the August 2007 issue of *PHYSICS TODAY* (page 24) a Physics Update item mentions recent work, by Dominik Legut and coworkers, proposing that the simple crystal structure of polonium arises from relativistic effects. The piece states that polonium is the only element with this structure. That is not true: For 20 years or more, the structure has been known to occur in phosphorus at pressures above 10 GPa, in calcium above 32 GPa, and in arsenic above 25 GPa. Since those elements are all much less heavy than polonium, it seems unlikely that relativistic effects

can be sufficient to account for their simple cubic phases.

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An item in the August 2007 Physics Update section states that “polonium, with atomic number 84, is the only element with a simple cubic crystal structure.” In the 21st century, that statement is a bit extreme.

Selenium, in the same element group as polonium, has an allotrope¹ with simple cubic structure, as described in a text by Jerry Donohue.² Perusal of his book will also illuminate simple cubic structures of other elements.

References

1. B. D. Sharma, *J. Chem. Educ.* **64**, 404 (1987).
2. J. Donohue, *The Structures of the Elements*, Wiley, New York (1974), p. 385.

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Legut replies: Richard Nelmes and Brahama Sharma are right that some other elements exhibit the simple cubic structure under high pressures and perhaps in thin films at elevated temperatures (see reference 1 in Sharma’s letter). However, that point was not the goal of our research. When we wrote in our article that polonium is the only element with the simple cubic structure, we meant that it is the only element with that structure under ambient conditions. We hope readers of our article do understand that “under ambient conditions” is implied.

For phosphorus, calcium, and arsenic under high pressure, we doubt that their simple cubic structure would be due to relativistic effects. The atomic numbers of these elements are too low. Most probably, at high pressures, the Gibbs energy of the simple cubic phase becomes lower than the Gibbs energy of the original phase without involving relativistic effects.

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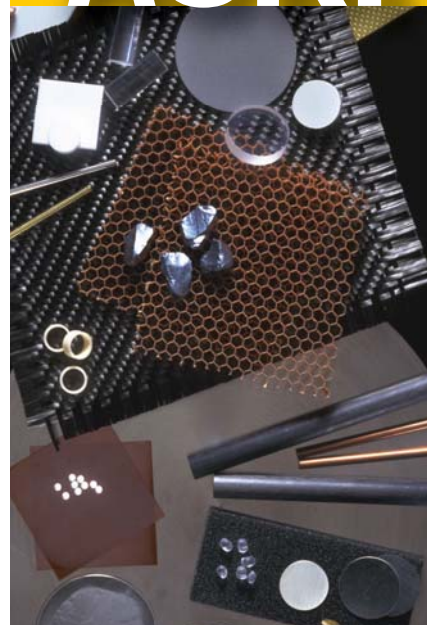
Academy of Sciences of the Czech Republic
Brno, Czech Republic

Corrections

September 2007, page 55—Equation 1 should read $Q = 1/2 (3II - 1)$.

August 2007, page 52—The name of the Vishwa Hindu Parishad was misspelled. ■

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