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This Week

Research Notes

Articles

Cover: Scientists are juggling genes in the garden, experimentally endowing plants with traits to enhance their durability and nutritional value. As the gene-altered plant foods near the market, researchers begin to address the potential safety concerns of consumers. (Photo: United Fresh Fruit and Vegetable Association)

Departments

Subscription Department
231 West Center Street, Marion, Ohio 43305

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Letters

Material difference

It seems surprising to me that so many accomplished physicists and chemists are finding different results and generally having difficulty repeating Pons and Fleischmann's results ("Cold fusion gets a bruisin' from DOE," SN: 7/29/89, p.78). When things do not make much sense, it is usually productive to look at the assumptions at work. What if they are actually all correct in their experimental results but are making an assumption about their experimental materials?

Imagine for a moment that the fusion is a surface phenomenon on the electrode. Hardness, electrical conductivity, speed of light, thermal expansion, rate of crystal growth, rate of solution and cleavage are all vectorial properties of solids that vary with the different crystal planes. It would not be too surprising that the fusion effect also depends on the crystallographic axis. Depending on how the surface of the electrode is oriented relative to the crystallographic axis of the material, the results could be quite varied.

When the palladium is sawed from a larger piece, the faces of the palladium electrode are not likely to be coincident with a crystallographic plane in the metal electrode. Accordingly, experiments with sawed or reworked palladium would give poor or inconsistent results. When the palladium is cast and cooled quickly, the crystals are randomly oriented and small, and are not oriented coincident with a surface of the metal electrode. Experiments with quickly cast and cooled palladium would also give poor or inconsistent results.

If it is a surface phenomenon on the electrode, then the surface damage could cause the effect to cease after a brief period of success. One would think that where fusion occurs, the surface might become damaged. Imagine an experimenter who sees results but then later does not. Wouldn't he retract his statement and question his devices (and possibly his sanity as well)?

There have been reports that stirring extinguishes the apparent fusion. This may be due to the disorientation of the surface layer of heavy water on the palladium crystal lattice.

If this were the answer to the discrepancies, a lot of people might feel better about their experimental results. Perhaps they are all correct after all.

Laurie Johansen
La Crescenta, Calif.

Address communications to:
Editor, **SCIENCE NEWS**
1719 N St., NW
Washington, D.C. 20036
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