

Du Pont Stakes Claim on Superconductor Rights

A fight looms over patent rights to the first high-temperature superconductor, as several companies hope to develop the material

DU PONT CO. HAS AGREED to pay as much as \$5.5 million to license the patent rights to superconductivity discoveries made by the University of Houston's Paul Chu. With this step, Du Pont stakes a claim to what could become the first of the much ballyhooed high-temperature superconductors to be commercially valuable—the yttrium-barium-copper-oxygen material $\text{YBa}_2\text{Cu}_3\text{O}_7$. Du Pont is also stepping into what many observers think could be an intense struggle for patent rights to this compound.

Since the discovery of the $\text{YBa}_2\text{Cu}_3\text{O}_7$ compound in early 1987, excited observers have predicted that such high-temperature superconductors could produce commercial applications as valuable as those of the transistor. When cooled to liquid nitrogen temperatures (below 77 K), these superconductors lose all resistance to the passage of an electrical current, and this property could eventually lead to such applications as super-fast computers, powerful magnets and loss-free electrical transmission. Although other superconductors were known before 1987, all of them had to be cooled with liquid helium, which is so expensive and difficult to deal with that it limited their value.

With so much commercial potential at stake, Du Pont wanted to guarantee itself access to developing the yttrium-based superconductor, said Edward Mead, Du Pont's manager of business development. Although Du Pont scientists have been active in exploring the properties of high-temperature superconductors in the year and a half since they were discovered, the company was not working toward them before they were discovered, as were IBM and AT&T Bell Labs, for instance. "Without being in on the ground floor, we could possibly be blocked [from developing the materials commercially]," Mead said.

The assignment of the patent rights to the yttrium materials, both in this country and others, is likely to be hotly contested, but most observers grant that Paul Chu and the University of Houston have one of the strongest claims to those rights. Chu filed a patent application on 12 January 1987, describing a whole range of possible superconductors before any of those materials had

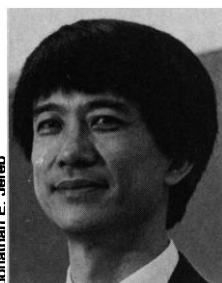
been seen to superconduct at 77 K. Chu says the patent application included the yttrium-based compound that eventually proved to be superconducting at more than 90 K.

Less than 3 weeks after the patent filing, on 30 January, M. K. Wu and colleagues at the University of Alabama in Huntsville first fabricated the high-temperature yttrium superconductor. Since Wu was working in collaboration with Chu, he immediately told Chu of the discovery, and it is here the patent story gets murky.

Most observers believe Chu filed another patent application after the discovery of the yttrium material, and University of Houston officials acknowledge there were further filings, but just when and what these filings were, they are not saying. The University of Alabama in Huntsville filed its own patent application for the yttrium material "shortly after the invention," said Vincent Sunderlick, a patent attorney representing the university.

Since both Chu and Wu have said their work was a collaboration, unraveling their respective patent rights could be tricky enough, but further complications are likely. AT&T Bell Labs researchers did a tremendous amount of work characterizing and understanding the yttrium material soon after its discovery was announced, and many observers guess that Bell Labs filed for some patents on the substance. IBM researchers, too, were close behind Wu and Chu. Other companies—such as Bellcore, which had fabricated the yttrium material before Wu did, but did not test it until it was too late—could also have filed patent applications.

Mead said Du Pont checked Chu's lab records on $\text{YBa}_2\text{Cu}_3\text{O}_7$ very closely and concluded that the University of Houston has a solid claim to the patent rights. He



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Paul Chu. His work brought Du Pont to the University of Houston.

added, however, "We won't be surprised to find that the University of Houston is in interference with other applications"—that is, that other groups have filed for the same or similar patent rights. One likely outcome of such a situation, he said, would be that some or all of the applicants could reach a settlement, in which case Du Pont would still have its desired patent rights.

Depending on how the patent fight turns out, Du Pont could pay up to \$5.5 million to the University of Houston, for which Du Pont would receive the exclusive rights to any commercial applications arising from Chu's work in superconductivity. Du Pont paid \$1.5 million upon signing of the agreement; if the university is granted patent rights to the material, Du Pont will pay another \$1.5 million then and a third \$1.5-million installment 2 years later. The third payment is optional, depending on whether Du Pont wants to continue licensing the patent rights to the superconductor. Du Pont also will pay royalties on commercial products made from the yttrium material.

In addition to the \$4.5 million in licensing fees, Du Pont has agreed to pay up to \$1 million in legal expenses to fight the patent battle. "This might get expensive, and Du Pont has agreed to pick up the tab," said University of Houston counsel Scott Chafin. The university already has incurred about \$100,000 in legal fees, Chafin said.

For its money, Du Pont will get more than just patent rights to the yttrium material. The agreement includes licensing of patent rights to all of Chu's superconductivity discoveries made up to the time of the agreement, not just the work on the yttrium material. In February, Chu and a group from Japan independently discovered a bismuth-based superconductor that becomes superconducting at a higher temperature than the yttrium compound, and many observers guess Chu filed patent applications on the bismuth compound.

"The money that we paid also gives us access to Paul Chu's work for the next 3 years," Mead noted. Under the agreement, Du Pont has the right of first refusal to license Chu's superconductivity discoveries for the next 3 years, and Chu will have a consulting agreement with Du Pont.

The Du Pont–University of Houston agreement is likely to be only the first of many legal maneuvers and agreements as companies jockey for position in the race to develop high-temperature superconductors. Although it probably will be years before anyone makes much money from commercial applications of these materials, and although it is far from clear just how much money will be made, the potential is too great to ignore.

■ ROBERT POOL