Aluminum adds flex to metallic glass

Until recently, expectations that lightweight, aluminum-rich glassy alloys could be substituted for denser materials in aerospace applications had been undermined by the brittle nature of these substances. But metallic glasses produced independently by U.S. and Japanese researchers now indicate that established processes can yield flexible, aluminum-rich glasses.

These alloys are more elastic because they contain a higher proportion of aluminum than do brittle glasses of similar compositions, says Joseph Poon of the University of Virginia in Charlottesville. As reported in the Sept. 23 SCIENCE, Poon, Yi He and Gary Shiflet produced metallic glasses with more than 90 percent aluminum. Previously, such synthesized metallic glasses contained less than 80 percent aluminum.

The new alloys, in the form of ribbons, also include iron and cerium. Poon told SCIENCE NEWS that alloys — synthesized at Tohoku University in Sendai and described in the April JAPANESE JOURNAL OF APPLIED PHYSICS — contain about as much aluminum, but include nickel and yttrium instead of iron and cerium.

He says his team will now try to locate other groups of elements that produce flexible, aluminum-rich alloys and study their atomic structures using X-ray- and neutron-diffraction techniques to understand why certain combinations work and others do not. "There's no theory right now to explain this," he says.

"But," he adds, "the techniques for creating the alloys are well established." Poon says aerospace companies already are capable of synthesizing aluminum-rich glasses using melt spinning, the technique both teams used to produce their alloys. Other common rapid-solidification methods could produce the substances in various shapes and thicknesses, adds researcher He.

The materials also are well suited for constructing aircraft and space vehicles, Poon says, because they crystallize at relatively high temperatures. Glasses tend to weaken over time, "but a higher crystallization temperature means a slower rate of change."

With crystallization temperatures of about 300°C, some of these alloys could remain stable, and therefore durable, for periods longer than human lifetimes, Poon says. Materials that crystallize at about 100°C might last only a few years.

Poon's group also plans to investigate its evidence that pockets of iron atoms within the disordered alloys seem to arrange themselves at temperatures much lower than those at which the glasses exhibit order when they crystallize. — *C. Knox*

Panel recommends resuming fetal studies

A National Institutes of Health (NIH) advisory panel concluded last week that the use of cells and tissues from aborted fetuses in biomedical research is "morally acceptable."

Following three days of lively and sometimes heated discussion, the 21-member panel of researchers, religious leaders and bioethicists put aside the ethics of abortion long enough to agree that the promising science of fetal cell transplantation should proceed in the United States, with certain restrictions. It remains unclear, however, whether President Reagan will preempt the panel's work by signing an executive order banning fetal research.

In the past few years, several lines of research in animals and humans have suggested that fetal cells may prove valuable in the treatment of Parkinson's disease, diabetes and other disorders. In March, Assistant Secretary of Health Robert E. Windom temporarily banned all federally funded research involving fetal cell transplants, saying legal and ethical concerns first needed to be addressed. Meanwhile, such research continued in Sweden, Mexico, China and elsewhere, with ambiguous results.

"We have approached the point where I believe it is unethical *not* to try this with human patients," said panelist Lars Olson of the Karolinska Institute in Stockholm, where two women with Parkinson's disease received fetal cell transplants last winter. Although it's too early to be certain, he said, "it appears that we are seeing minor positive changes in the two patients."

Other researchers provided evidence of the therapeutic potential of fetal cells for a range of neurologic and biochemical disorders. But some theologians and representatives from anti-abortion groups testified that to use tissues from intentionally aborted fetuses makes biomedical researchers "accomplices to murder." Moreover, they asserted, a woman's decision to abort creates an "adversarial relationship" between mother and fetus, and calls into question her moral right to donate the aborted tissues to scientific research.

"The abortion question was in the background, hovering over us all the time," says Arlin M. Adams, a retired federal judge who chaired the panel.

The panel's final recommendations, which will include provisions to limit the commercialization of fetal tissue, are to be presented to NIH officials Dec. 1. — *R. Weiss*

Fatty acids cut heart-artery renarrowing

A new study shows that heavy doses of fish-oil fatty acids may prolong the effectiveness of coronary angioplasty, a procedure in which narrowed heart arteries are enlarged by insertion and inflation of a tiny balloon.

In 25 to 40 percent of U.S. patients undergoing angioplasty, the opened arteries narrow again, often within three months. Various treatments tried so far have failed to help. But when researchers at two Dallas hospitals gave angioplasty patients a long-term dietary supplement of n-3 fatty acids — also known as omega-3 fatty acids and found in fish oil — the incidence of arterial renarrowing decreased markedly.

Seven days before undergoing angioplasty, patients in an experimental group began a six-month course of treatment with 5.4 grams daily of n-3 fatty acids, in capsule form, in addition to a standard treatment of aspirin and dipyridamole, a drug used to prevent platelet clumping. A control group received only the standard treatment.

In 82 patients the researchers performed angioplasty on 103 narrowed arterial passages. The extent of disease and reduction in narrowing were comparable in both groups.

Three to four months later, they found that 19 percent of patients in the treatment group and 46 percent of the control group showed signs of recurrence. They also observed significantly less renarrowing per blockage in the experimental group: 16 percent, compared with 36 percent in the controls. Follow-up for as long as a year showed no new symptoms of renarrowing in the treatment group, the researchers report in the Sept. 22 NEW ENGLAND JOURNAL OF MEDICINE.

Led by Gregory J. Dehmer, who is now at the University of North Carolina in Chapel Hill, the study was performed at the Dallas Veterans Administration Medical Center and the University of Texas Southwestern Medical Center at Dallas. It is significant, the researchers say, that the patients studied — all of whom were male and most of whom smoked heavily — were at high risk for recurrence.

The role of n-3 fatty acids in preventing heart disease has been a subject of controversy (SN: 11/28/87, p.342; 7/23/88, p.52). Exactly how they discourage renarrowing of the arteries remains unknown. Nonetheless, the researchers say the new results suggest the treatment appears "safe and well tolerated" in a high-risk group and warrants large-scale testing to determine whether other patients will also benefit. — *C. Eron*