

Chemical vapour deposition advances superconductors

Tokyo

JAPANESE researchers are developing a technique that may open the way to mass production of wires, coils and complex-shaped thin films of high-temperature superconductors. A group at Tohoku University, in collaboration with Riken Corporation, a piston-ring manufacturer, has used chemical vapour deposition to coat a variety of substrates with thin films of yttrium-barium-copper oxide.

Chemical vapour deposition, widely used in the semiconductor industry, allows thin films of even thickness to be deposited over the micron-sized steps and channels of the circuit substrates, and large numbers of substrates can be coated at one time. Several semiconductor manufacturers around the world have reportedly tried the technique with high- T_c superconductors, but could not find a suitable barium compound to vaporize. Until now, physical vapour deposition techniques, such as sputtering and electron beam evaporation, have been used to prepare high- T_c thin films.

In the new method, evaporated 'source materials' (of undisclosed composition) containing yttrium, barium and copper are heated separately to different temperatures, evaporated and carried by argon gas into a heated low-pressure reaction chamber (700–900 °C, 10 torr) containing the substrate to be coated.

Oxygen is introduced separately, chemical reactions occur and a thin film of yttrium-barium-copper oxide is deposited on the substrate at a rate of about 1 micron per hour. Annealing is not required but oxygen treatment after deposition improves film quality.

The Tohoku team has coated a variety of substrates using the new technique, including a coil of chrome-nickel alloy. Unlike physical vapour deposition, for which particular substrates such as strontium titanate or magnesium oxide must be used to produce films with orientated crystals, the chemical vapour deposition method allows crystal size and orientation to be adjusted by altering the conditions in the reaction vessel.

According to Professor Toshio Hirai, highly orientated polycrystalline films have now been prepared and he foresees use of the technique in the manufacture of current-carrying wires and coils and in the development of electronic devices.

The technique is still in its infancy. Critical currents have not yet been measured and the critical temperature T_c at which electrical resistance vanishes is less than in thin films prepared by physical vapour deposition. But on 3 March, the team announced a T_c of 43 K and by last Thursday they were up to 72 K for a film on a magnesium oxide substrate.

David Swinbanks

CFC protocol agreed

Washington

THE US Senate last week voted 83–0 to approve ratification of an international agreement that was signed last September in Montreal by 31 countries, and is designed to limit global release of chlorofluorocarbons (CFCs).

The protocol now goes to the White House where President Reagan is expected to sign it. Mexico is the only other country to have approved the treaty, but the United States is the first major user and producer of CFCs to approve it.

The protocol takes effect on 1 January 1989 provided that 11 countries accounting for two-thirds of the global CFC consumption have approved it. Otherwise, the protocol becomes effective 30 days after that criterion is met.

J.P.

HIV-2 detected in UK

London

As was inevitable, a case of infection with the second type of human immunodeficiency virus (HIV-2), which predominates in West Africa, has been detected in Britain. The evidence has emerged from a small-scale programme of anonymous testing at Middlesex Hospital Medical School of blood samples taken in a sexually transmitted disease clinic in London. Cases of HIV-2 infection in other European countries, notably France and Sweden, and in the United States (see *Nature* 331, 381; 1988) have so far been confined to people with West African connections. Although that is almost certainly also true of the infected individual now detected in London, the anonymity of the testing prevents confirmation. Blood-bank screening for HIV-2, as well as HIV-1, may have to follow.

P.N.

Newborns to be tested

Washington

THE Centers for Disease Control (CDC) in Atlanta announced last week a programme for anonymous blood tests of newborns for the presence of antibodies to HIV (human immunodeficiency virus).

The tests will be conducted in 30 cities in the United States, chosen on the basis of a high reported prevalence of HIV, high prevalence of other sexually transmitted diseases and geographical distribution. The testing programme is expected to be ready by the end of May.

The newborn testing is just one of a series of surveys being conducted by CDC to obtain a better picture of the prevalence of HIV in the general population. Other surveys will include voluntary testing of patients visiting sexually transmitted disease clinics, as well as tests on adult hospital patients. The hospital tests will involve orthopaedic patients, who as a group are more representative of the general population than other in-patients.

J.P.

AIDS and public opinion in France

Paris

Two surveys carried out recently by researchers at INSERM, the French National Institute of Health and Medical Research, show how information campaigns about AIDS are affecting public opinion and behaviour. The first, carried out last June had a nationwide sample of 1,500 respondents; the second, carried out in December 1987, sampled 900 people in the Paris area. Although the two surveys are not strictly comparable, they show a change in attitudes to AIDS over the six months between them.

According to both surveys, AIDS is considered a major health risk by the French public — less feared than cancer, but more feared than heart disease. But the rate of false beliefs about the disease is high. Just over 52%, for example, believed they could contract the AIDS virus by giving blood and nearly 37% thought the virus could be transmitted through saliva.

Although less educated respondents felt they could contract the disease through simple bodily contact, even those with a *baccalauréat* (secondary education

diploma) felt that the human immunodeficiency virus (HIV) could be transmitted by mosquitoes, on dental instruments or by sharing a hospital ward with a patient suffering from AIDS.

Attitudes towards compulsory screening for the presence of HIV had changed between the two surveys. In June, 73% of the sample were in favour of systematic screening of the whole population, while in December the proportion had dropped to 37.8%. However, the researchers point out that many of the later sample were in favour of compulsory screening of certain sectors of the population. Over 78% felt that pregnant women should be screened.

The AIDS information campaign initiated by the health ministry has concentrated on short television films and films aimed at secondary school children. Leaflets have also been sent out to general practitioners. But, compared to Britain, where there are regular poster campaigns, magazine advertisements and films about the disease, it is possible to be in Paris for weeks without seeing any evidence of a health campaign.

Peter Coles