CHEMISTRY

Carbon-12 New Standard

Carbon atom weight 12 is the new standard for the chemical elements, Watson Davis reports from the International Congress of Pure and Applied Chemistry meeting in Montreal.

➤ A NEW STANDARD for the weight of all the building blocks of the universe, the chemical elements, has been settled after some years of bitter controversy with the selection of carbon atom weight 12.

All of the 103 known elements will be refigured, but the differences in the familiar periodic tables on schoolroom walls and in scientific books will not be apparent until the second decimal place in any case.

Oxygen atom 16 is dethroned as the standard. In fact, two oxygen standards are displaced. The chemists have in the past taken natural oxygen as 16 and the physicists have taken the isotope of oxygen 16 as bases. As there are three kinds of oxygen, isotopes 16, 17 and 18, in the natural oxygen in the air, there was a difference. Oxygen is now 15 followed by decimal 9994 with plus or minus one in the fourth decimal place.

The Council of the International Union of Pure and Applied Chemistry, meeting in Montreal, announced that they had joined the action of the equivalent union in physics taken previously on the carbon-12 base. There had been strong feeling for and against the change, not on national lines but depending upon the fields of science.

The international chemical body, with representation from all parts of the world, Communist as well, also straightened out nomenclature in thermodynamics so that formulas will be written the same the world over.

The standardization accomplished recalls that British, Canadian and United States scientists two years ago agreed on using the same length for the inch, which was equated to 2.54 centimeters. It changed the U. S. inch by four parts in a million, a matter of about six inches in the distance from Washington to New York.

The U. S. representative in the work on adoption of the carbon-12 standard was Dr. Edward Wichers, associate director of the National Bureau of Standards. Dr. A. W. Noyes of the University of Rochester, Rochester, N. Y., who is president of the International Union of Pure and Applied Chemistry, was also influential in adoption of the new standard.

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New Materials Sought

➤ BECAUSE MAN is reaching for space and even eventually to the stars, extremely high temperatures were considered at the International Congress of Pure and Applied Chemistry in Montreal.

The search for new materials is directed to substances that will withstand both the extreme heat of rocket travel and the sub-icy cold of empty space, as well as the rigors of temperature in nuclear reactors and plasmas generated in attempts to harness the thermonuclear H-bomb for power. The high temperatures of most interest extend from about 3,700 degrees Fahrenheit to hundreds of thousands of degrees—the lowest range of which is far above where steel glows white hot.

The existence of complex gaseous compounds that are not analogous to those in solids or liquids has been demonstrated.

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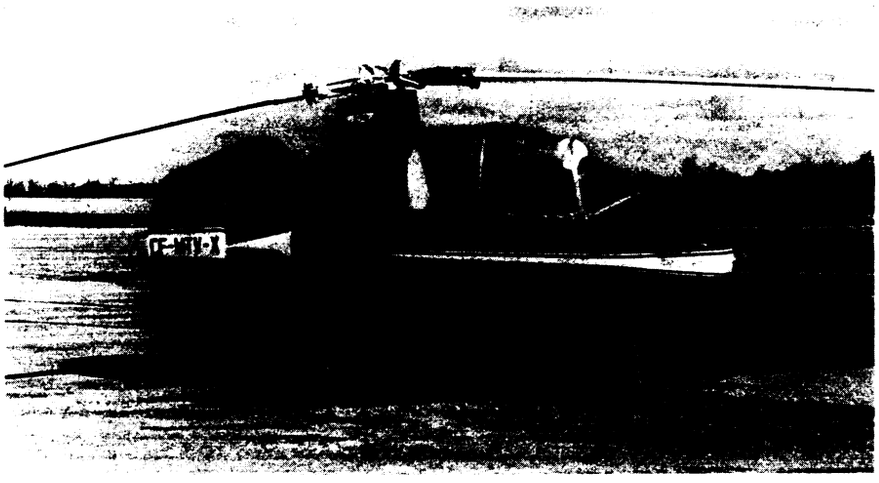

LIGHTWEIGHT PLANE—A thin skin of polyester resin and fiberglass covers the Avian 2/180 gyroplane. The covering, having unusual strength and light weight, was made by the Hooker Chemical Corporation, Niagara Falls, N. Y.

Light Shows Food Poisons

➤ SOME POISONS sprayed on foods to combat insect pests can be made to signal their danger by the light they give off when flooded with ultraviolet radiation.

The International Congress of Pure and Applied Chemistry in Montreal was told by Dr. D. MacDougall of the Chemagro Corporation of Kansas City that fluorescence measurements have higher sensitivity than other methods, but can be applied only when the chemical itself is fluorescent or can be made to produce a compound that has this effect.

Increasing stringency of control regulations of many governments has caused chemists to search for new and better analytical methods for detecting the residues of pesticides left in food.

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Tantalum Carbide Lights

➤ BY USING TANTALUM carbide instead of tungsten in electric lamp filaments, a bulb that gives one-half again as much light and lasts up to twice as long has been produced.

Research on the new high brilliancy lamps was reported to the International Union of Pure and Applied Chemistry in Montreal by two scientists from Polaroid Corporation, Cambridge, Mass., Dexter P. Cooper, Jr., and George R. Bird. Although not yet manufactured, the new lamps are expected to be particularly useful in projectors for slides and films because the screen brightness depends on the actual brightness of the filament's surface.

The new tantalum carbide filament burns at a temperature of about 6,000 degrees Fahrenheit, whereas ordinary projector lamps burn at about 5,500 degrees Fahrenheit. The new lamps burn 24 hours, it is claimed, compared with 10 to 12 hours of presently used lamps.

One of the problems in the perfection of the new lamp was to find an atmosphere that would allow tantalum carbide to be heated to high temperatures and remain stable. Suitable gaseous atmospheres consisting of hydrocarbons and hydrogen were devised.

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Waste Lignin for Tires

➤ BY USE OF LIGNIN, a waste product in paper manufacture comprising a large percentage of wood, satisfactory tires can be made with a reduction of the crude rubber content of 10% to 40%.

This chemical result was announced to the Chemical Institute of Canada in Montreal by a team of Canadian chemists from the National Research Council, Ottawa, the Howard Smith Paper Mills, Cornwall, Ont., and the Army Development Establishment, Ottawa, consisting of T. R. Griffiths, D. W. MacGregor and Lloyd Krichew.

Lignin is used in both the carcass and tread of large diameter tires of nylon cord construction.

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