METALLURGY

Hot Arc Promises Metals

➤ MANGANESE and other vital metals can be coaxed from low-grade American refractory ores with a high intensity electric arc, whose temperatures reach those of the sun.

The process that promises to free American defense from the need of importing some strategic metals was described by its developer, Dr. Samuel Korman of the Polytechnic Institute, Brooklyn, N. Y.

Manganese, an important ingredient in steel making, is presently imported from Russia, Brazil and India because American ores, although plentiful, are too difficult to work.

Dr. Korman incorporates such ores as rhodonite, the complex manganese silicate ore, into the anode tip of an electric arc somewhat like the carbon arc light once used for street lighting.

By feeding additional current into such an arc, he reaches temperatures at which refractory ores are broken up chemically and their metals boil out. Suitable quenching methods allow Dr. Korman to recover metals not practical to obtain by other processes.

Uranium, titanium, beryllium and lithium are among the strategic metals that may become available by this process, used hitherto only on a limited laboratory scale. Dr. Korman reported these possibilities at a meeting at the Polytechnic Institute of Brooklyn, on behalf of himself, Dr. Charles Sheer and associates.

Temperatures ranging from 13,000 to 18,000 degrees Fahrenheit are attained in the high intensity arc in Dr. Korman's process. They are reached by a series of steps as the current fed to the arc increases.

Beginning with a point on the anode where the first electrons strike when the arc is produced, the whole area of the end of the carbon rod becomes involved in producing the hot, brilliant light as the current increases. Further increase of current beyond this point raises the heat to high temperatures by an effect described by Dr. Korman as an "electronic log-jam."

Metal boiling vigorously out of the ore that has been incorporated into the anode forms an ionized vapor that steams out of the high temperature region in Dr. Korman's apparatus like a jet at a speed of Mach 0.2 to 0.5.

Electromagnetic fields can be used to deflect and to accelerate these metallic ions, which can be separated by this means, as well as by regulation of the temperature. Pure oxides of silica and of the metal are recovered. The silica comes out as tiny spheres, perfect in shape but so small they can be seen only with the electron microscope.

Varying the composition of the atmosphere surrounding the ionized metal atoms can cause them to combine with other elements, such as chlorine, if such combination is useful for further processing.

Science News Letter, March 10, 1956

TECHNOLOGY

Trap Sun's Energy

➤ ENERGY trapped from the sun with specially coated plates may some day drive engines and heat homes.

H. Tabor of the National Physical Laboratory of Israel, Jerusalem, has announced discovery of an inexpensive method of capturing solar energy.

To demonstrate his technique, Mr. Tabor constructed a solar energy trap comprised chiefly of a sheet of copper electroplated with nickel, zinc and sulfides.

According to Mr. Tabor, the electroplating process produces a very thin black deposit on the sheet that permits the metal to absorb short wave energy from the sun, which is converted to potentially useful long wave energy (heat).

Mr. Tabor's research shows that, when a bright metal is coated in this way, it can absorb over 90% of the wave energy of the visible spectrum, which is short wave energy.

The most significant feature of the solar energy trap, Mr. Tabor pointed out, is its retarded rate of radiation. Because the electroplated surface radiates the sun's heat much more slowly than usual black surfaces, it becomes much hotter when exposed to the direct rays of the sun than would normally be expected. A number of alternative surface treatments, including some suitable for aluminum plates, have also been developed.

Science News Letter, March 10, 1956

ENTOMOLOGY

Virus Spray Kills Forest Insect Pests

➤ CONTROL of at least two species of pine sawfly with a virus-disease spray has led scientists to believe virus diseases may be used to exterminate a variety of forest insects.

Experiments conducted by four U. S. Department of Agriculture scientists have shown that the Virginia pine sawfly, an insect pest of eastern and central United States, can be controlled by specially cultivated viruses. Earlier tests showed that the European pine sawfly could be controlled.

The scientists, insect pathologists S. R. Dutky, J. V. Thompson and C. G. Thompson of the U. S. Agricultural Research Service, and entomologist J. M. Davis of the Forest Service, cultivated viruses known to infect sawflies in Maryland pine trees. The disease-inflicting spray has been 77% to 100% effective.

The original viruses used in developing the final culture were obtained from infected sawfly larvae in Maryland.

Field tests showed that, 11 days after spraying, 77% of the larvae collected from 38 infected trees were dead.

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