

Turner (to Bausch & Lomb Optical Co.). U.S. 2,519,722, Aug. 22, 1950. Reflectivity of polished metallic mirrors is increased by depositing transparent films of nonmetallic materials, having high and low  $n$ , in alternating order on a metallic reflecting surface. Each layer has a thickness of a quarter of a wave length  $\pm 5\%$  of the light in the portion of the spectrum ranging from 500 to 600 microns. Best results were obtained when a low index film was deposited on the metallic surface, followed by a high index film on top of which a low index film was deposited followed by a high index film. By using ZnS and MgF<sub>2</sub> for low and for high index films, the reflectivity of an Al mirror was increased from 92% to 99%. J. D. Gat

(Ferrous) metal alloy. Vincent T. Malcolm (to Chapman Valve Manufacturing Co.). U.S. 2,523,838, Sept. 26, 1950. An economical corrosion-, acid- and heat-resistant stable alloy, not requiring heat treatment, and suitable for processing equipment in the oil and chem. industries because of weldability without loss of desirable phys. properties (which are given), contains Cr in greater (or equal) proportion than Ni, along with C, Mn, Si, Al, Cu, Mo, Cb, S, and P. The value of each element in the final alloy is described in the range of the following suggested ideal quantities: C 0.03, Mn 1.12, Si 0.86, Cr 22.84, Ni 21.64, Mo 3.30, Cu 6.05, Al 1.04, Cb 0.54, S 0.03, P 0.03%, the rest Fe. A. H. Adams

Forging aluminum alloy. Horace C. Hall, Harold E. Gresham, Wm. M. Doyle, and Clifford Wilson (to Rolls-Royce Ltd. and High Duty Alloys Ltd.). U.S. 2,522,575, Sept. 19, 1950. A new Al alloy type suitable for cold and hot forging automotive engine parts is described. It has a compn. aside from Al of Cu 1.8-2.5, Mg 1.2-2.0, Ni 0.8-1.5, Fe 0.85-1.5 (total Fe-Ni not more than 2.75), Si 0-0.4, and Ti 0.02-0.2%. Furthermore, Nb, Ce, Be, Zr, Sb, Mn, Mo, Cr, V, Zn, Co, and Ag may be added up to 0.5% each but not more than 1.5% in total. Content of Ca, Ba, Sr should be less than 0.2%, and Sn, As, Bi, Cl, B, Li, Na, K less than 0.1%. The heat-treatment is carried out at 525-545° for 2 to 30 hrs., followed by quenching and aging at 170-250° for 1 to 30 hrs. F. C. Nachod

Titanium alloys. Wm. J. Kroll. U.S. 2,522,679, Sept. 19, 1950. TiCl<sub>4</sub> is a good solvent for other metal chlorides. Thus anhyd. metal chlorides can be prep'd. by dissolving the oxide or water-contg. metal chloride in TiCl<sub>4</sub>; the TiCl<sub>4</sub> hydrolyzes to TiO<sub>2</sub> with liberation of HCl. The technique also leads to prep'n. of a new type of getter material in electronic or gas-discharge tubes. Highly oxidizable metals, such as Zr, Hf, Th, Y, Nb, Ta, Cr, and U are dissolved as chlorides in TiCl<sub>4</sub>, and after filtering, the soln. of the chlorides is reduced in an inert gas atm. with molten Mg, followed by compacting and sintering steps. TiCl<sub>4</sub> will dissolve 14-15% TaCl<sub>5</sub> at 25° and 40% TaCl<sub>5</sub> at its b.p., 136.4°. NbCl<sub>5</sub> dissolves to 0.24% at 25° and 2% at the b.p. ZrCl<sub>4</sub> dissolves to 30% in TiCl<sub>4</sub> at 25°. The getter alloys formed are substantially free of embrittling oxides, nitrides, or hydrides. Frederick C. Nachod

Forming uranium-carbon alloys. James H. Carter and Adrian H. Daane (to the United States of America, as represented by the Atomic Energy Commission). U.S. 2,526,805, Oct. 24, 1950. U-C compds. and U-C alloys having a low C content are formed from U metal and C either by melting U metal in contact with a C surface at a temp. in excess of the m.p. of U, or by mixing powd. U metal and powd. C in desired amts., pressing into blocks under pressures of 20-50 tons/sq. in., and then heating the blocks between 1800 and 2000°. If U metal is melted in contact with a C surface the increase of C obtained in the alloys is a function of the temp. at which the melt and graphite crucible are maintained. When a block composed of powd. U and C is used as the starting material the melting operation is carried on in a graphite or beryllia crucible. When a graphite crucible is used the pressed block is supported on a block of U<sub>2</sub>C<sub>3</sub> to prevent absorption of C from the crucible. The reaction temp. to be maintained

is dependent on the percentage of C desired in the final alloy. The material is kept in a CO<sub>2</sub> atm. up to the point of heating of the pressed block and the heating is carried out *in vacuo*. A compn. of 95.7% U by wt. and 3.6% C, remainder being unreacted U, is obtained by mixing 78.8 g. of powd. U and 3 g. of powd. C pressed at 20 tons to give a block  $\frac{1}{2} \times \frac{1}{2} \times 2$  in. This block is heated in a Zr crucible *in vacuo* at 1800-2000°. Cf. C.A. 43, 500c. G. E. K.

Cleaning copper-containing metal articles. Joseph J. Bayer. U.S. 2,522,496, Sept. 19, 1950. In order to clean Cu-contg. materials, such as brass, and remove oxide films, the articles are heated to about 900°F. and then quenched in a soln. consisting of 1 lb. ZnCl<sub>2</sub>-NH<sub>4</sub>Cl (93:7 parts by wt.) in 1 gal. of H<sub>2</sub>O. Frederick C. Nachod

Coating copper articles with lead alloy. Richard H. Jenks and Wilson Lynes (to Revere Copper and Brass Inc.). U.S. 2,525,603, Oct. 10, 1950. Copper articles are coated with a Pb alloy contg. not more than 3.3%, nor less than 0.5% Sb forming a single-phase alloy. About 0.001% Al is added to prevent drossing of Sb. C. L.

Dip process for coloring cadmium. Jesse E. Starck (to United Chromium, Inc.). U.S. 2,524,577, Oct. 3, 1950. The purpose of the invention is to improve the coating of Cd obtained by dipping, enabling the formation of a good, lustrous black coat which withstands corrosion and has good adherence. The dip soln. contains a chromate and an auxiliary or catalytic acid ion, preferably sulfate or fluoride, and the silver ion. It is similar to dip solns. customarily used except for the presence of a small quantity of silver ion. This ion is thought to increase the tendency of Cd to go into soln. It is also thought that the surface metal reduces some of the chromate and black, basic chromium chromate (Cr(OH)<sub>2</sub>CrO<sub>4</sub>) forms on the surface. Formulas of several suitable baths are given. The dip may be used either warm or cold. Time of immersion is from half a minute to 5 min. The pH range is 1.0 to 3.00. H. B. Gordon

Coating zinc-base alloys. Edward A. Kruszynski and Barclay F. Smith (to Cater Carburetor Corp.). U.S. 2,527,828, Oct. 31, 1950. To produce protective, corrosion-resistant coatings on Zn or Zn-base alloys, the articles are immersed for 10 sec. in a soln. contg. Cr(NO<sub>3</sub>)<sub>3</sub>·9H<sub>2</sub>O 100, oxalic acid 13.5 g., and 90% H<sub>3</sub>PO<sub>4</sub> 5 ml. in 1 l. H<sub>2</sub>O kept at 160°F. Frederick C. Nachod

Plating with metal carbonyl. John T. Young and Olindo R. Angelillo. U.S. 2,523,461, Sept. 26, 1950. A very thin, protective coating of Ni is plated from a soln. of Ni(CO)<sub>4</sub>. The object to be coated is heated to 450-575°F. and dipped into a normally volatile hydrocarbon, such as benzene, contg. 1% Ni(CO)<sub>4</sub> at -20 to 80°F. The temp. of the object must not fall below 400°F. The decompn. of Ni(CO)<sub>4</sub> causes Ni to coat the object. The object is cooled to 300°F. or below in an inert atm. to prevent the Ni coating from corroding. Ni coatings 10<sup>-6</sup> inch thick are obtained. Dippings can be repeated to form thicker coatings. The process can be used to form protective coatings for the production of precision instruments without affecting the dimensional tolerances. Eugenia K. Williams

Anticorrosion coating for metals. Leo R. Whiting and Philip F. Wangner, Jr. (to the United States of America, as represented by the Secy. of the Navy). U.S. 2,525,107, Oct. 10, 1950. The addn. of a polyvinyl butyral resin to a phosphoric acid soln. will increase the corrosion resistance of the resultant film. C. Louis

Solder flux. Gordon M. Forker (to General Electric Co.). U.S. 2,522,937, Sept. 19, 1950. A nonconductive, noncorrosive solder flux is described employing (%) solvents 75-95, amine-HCl 1-5, metal chloride 2-15, and fatty acid 2-10%. Solvents of choice are diols, such as 2-ethyl-1,3-hexanediol, 2-methyl-2,4-pentanediol, and 2-methyl-1,3-pentanediol. In a specific example, the compn. is given as 2-methyl-2,4-pentanediol 65-70, 2-ethyl-1,3-hexanediol 15-20, C<sub>6</sub>H<sub>5</sub>NH<sub>2</sub>-HCl 2-3, ZnCl<sub>2</sub> 5-7, stearic acid 5-7%. Frederick C. Nachod

## 10—ORGANIC CHEMISTRY

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$\alpha$ -Methylene reactivity in olefinic systems. IV. The structure of the dimer formed by the stannic chloride-catalyzed polymerization of trimethylethylene. Synthesis

and characterization of isomeric methyl hexyl ketones. John W. Baker (Univ., Leeds, Engl.). *J. Chem. Soc.* 1950, 1302-9; cf. C.A. 43, 6967h.—The dimer (I), b<sub>p</sub> 46° of