Catalysis by a solid product of topochemical reactions. G. V. Sakovich and V. V. Boldyrev (V. V. Kuibyshev State Univ., Tomsk). *Zhur. Fiz. Khim.* 32, 298–305(1958).—The literature on the autocatalytic effects of the solid products of chem. reactions is reviewed (76 references). The solid products affected catalytically only the rate of the reactions. The velocity of topochem. reactions passed through a max. because of the formation of reaction zones, and not by an actual catalytic effect of the reaction products, which was expressed only in the reaction consts. An effect of addn. of solids was not identical with autocatalysis.
W. M. Sternberg

Cerium phase diagram. A. I. Likhter, Yu. N. Ryabinin, and L. F. Vereshchagin. *Soviet Phys. JETP* 6, 469–71 (1958)(English translation).—See *C.A.* 52, 4300e.
B. M. R.

The application of a method of comparative calculation of two-phase one-component systems. M. Kh. Karapet'yants (D. I. Mendeleev Chem. Technol. Inst., Moscow). *Zhur. Fiz. Khim.* 32, 306–17(1958).—The 4th method of calcn. of a 2-phase single-component system is described (*C.A.* 50, 7549a; 51, 833f) and discussed; as an example conditions in the liquid-vapor equil. in 1-component systems are studied. The heats of evaporation of some substances (an example of the application of one of the methods of comparative calculations). *Ibid.* 554–68.—An approx. method of computation of the heats of evapn. is described as an example of the 4th method described in the articles referred to above. Approx. values of the heats of evapn. of 101 org. substances up to their crit. points were calcd. (including 95 substances for which the temp. relations of the heats of evapn. were unknown). 52 references. W. M. Sternberg

Diagrams of state of thermodynamic systems with a non-maximum order of concentration matrixes. L. S. Palatnik, A. I. Landau, and V. S. Zorin (A. M. Gor'kii State Univ., Kharkov). *Zhur. Fiz. Khim.* 32, 608–14(1958).—The topology of the equil.-system diagrams was investigated. The hyperconnode conception was generalized to cases of any order of concn. matrixes. The hyperconnodes on the P, T, X_i diagrams were simplexes of dimension $l = r - 1 - \epsilon - \sigma$, which are degenerate at $\epsilon + \sigma > 0$. An examn. of hyperconnodes may help in the further investigation of the properties of systems with $\sigma > 0$ and of the processes of such systems. It can also be applied to the investigation of those problems in the equil.-diagram theory that were considered only for systems of the max. order. $r = $ no. of phases; $n = $ no. components; $\epsilon = $ max. of values of $(r - h)$ or 0; $\sigma = $ the concn. matrix. W. M. Sternberg

The electrical conductivity of systems that contain silicon tetrachloride, stannic chloride, and esters. Yu. N. Vol'nov. *Zhur. Fiz. Khim.* 32, 498–505(1958).—The cond. of 6–12 mol. % $SiCl_4$ systems with Me formate, Et formate, and EtOAc was greater than that of the pure components, owing to the formation of complexes; with dioxane, BuOAc, Et butyrate, and benzyl and phenyl acetates it was too small to be measured. The cond. of $SnCl_4$ systems with the esters was detd. at various temps., and the results were tabulated and reproduced graphically. W. M. Sternberg

Viscosity of binary systems from chloral. II. V. V. Udovenko and R. I. Khomenko. *J. Gen. Chem. U.S.S.R.* 26, 3291–5(1956)(English translation).—See *C.A.* 51, 7122d.
B. M. R.

Physicochemical analysis of binary systems formed by acetamide with organic acids. IV. Surface tension of binary systems formed by acetamide with acetic acid and its chloro derivatives. Yu. I. Bokhovkina. *J. Gen. Chem. U.S.S.R.* 26, 3285–9(1956)(English translation).—See *C.A.* 51, 7122a.
B. M. R.

Surface tension of binary systems composed of acetic acid and its chloro derivatives. I. M. Bokhovkin. *J. Gen. Chem. U.S.S.R.* 26, 3281–3(1956)(English translation).— See *C.A.* 51, 7121h.
B. M. R.

Liquid-liquid solubility of pentaerythritol tetrakis(perfluorobutyrate) with chloroform, carbon tetrachloride, and octamethylcyclotetrasiloxane. Kozo Shinoda and J. H. Hildebrand (Univ. of California, Berkeley). *J. Phys. Chem.* 62, 481–3(1958); cf. *C.A.* 52, 11529e.—Liquid-liquid soly. curves for mixts. of $CHCl_3$ (I), CCl_4 (II), and $(CH_3)_8$-cyclo-Si_4O_4 (III) with $(C_3F_7COOCH_2)_4C$ (IV) were detd. in order to show the effects of great disparity in molal vols. The molal vols. were I 81, II 97, III 312, and IV 542 cc. The crit. temps. and compns. in mole % IV

were: I 43.5°, 7.3; II 72.1°, 9.1; III 123.5°, 30.7. The crit. compns. in the very unsym. systems I and II agreed well with an expression derived from a regular soln. equation in which the entropy term was based on mole fraction instead of vol.-fraction. Henry Leidheiser, Jr.

The structure of the eutectic lead/tin alloy film prepared by a melting method. N. Takahashi and K. Ashinuma (Univ. Yamanashi). *J. Electronmicroscopy* (Chiba) 6, 29–33(1958); cf. *C.A.* 51, 10227g.—The lamellar structure of this alloy (38% Pb/62% Sn) was confirmed by electron microscopy and electron micro-diffraction of thin films. Phase transformations upon heating films appear to differ from those seen in solid specimens. John O. Erickson

Phase diagrams of FeO-TiO_2 and Fe_2O_3-TiO_2 systems. T. Yoshida and T. Takei (Keio Univ., Tokyo). *Denki Kagaku* 25, 423–7(1957).—In connection with titania slag production from magnetite sand, the phase diagrams were constructed for the systems FeO-TiO_2 and Fe_2O_3-TiO_2 by the use of an elec. furnace of high frequency a.c., by the measurements of the x-ray diffractions, and by microscopic observations. In the binary system FeO-TiO_2 the following 3 compds. were found: $2FeO.TiO_2$ (named η-phase; with spinel structure), $FeO.TiO_2$ (ζ-phase; with hexagonal, rhombohedral lattice), and $FeO.2TiO_2$ (ε-phase; with tetragonal lattice). In the binary system of Fe_2O_3-TiO_2, only one compd., $Fe_2O_3.TiO_2$ (with tetragonal lattice), was found. M. Tsuboi

Phase diagrams of $Ca_3(PO_4)_2$-$Mg_3(PO_4)_2$ and $Ca_3(PO_4)_2$-$CaNaPO_4$ systems. Jumpei Ando (Univ. Chuo, Tokyo). *Bull. Chem. Soc. Japan* 31, 201–5(1958); cf. Klement and Steckenreiter, *C.A.* 36, 514.—The small amt. of MgO contained in $Ca_3(PO_4)_2$ replacing CaO stabilizes the β modification of the phosphate. However, a new compd. $Ca_7Mg_9(PO_4)_8$ is formed below 1175° when more than 0.5 mol. of MgO to 1 mol. of P_2O_5 is introduced into the phosphate. This compd. is sol. in citric acid but less sol. in neutral ammonium citrate just as is serpentine-fused phosphate fertilizer. In the $Ca_3(PO_4)_2$-$CaNaPO_4$ system, a cryst. soln. with α-rhenanite structure is easily formed within the range of $2.6CaO.0.4Na_2O.P_2O_5$–$2.4CaO.0.6Na_2O.P_2O_5$, and is furthermore stabilized by the admixture of Ca orthosilicate. This cryst. soln. is highly sol. in both citric acid and citrate, composing a principal part of low-alkali calcined *phosphate fertilizers*. R. E. Dunbar

Vapor-solid equilibriums in the iron-chlorine system. Laurence E. Wilson and N. W. Gregory (Univ. of Washington, Seattle). *J. Phys. Chem.* 62, 433–7(1958).—The vaporization and thermal decompn. equil. of $FeCl_3$ were investigated by gas satn. flow and diaphragm gage techniques. At 220–400° and at flow rates between 3 and 60 ml./min. the results are given by the equation, $\log P_{Cl_2}/P_{FeCl_3} = 1408/T - 3.710$. Other data could be described by the equations, $\log P_{FeCl_3}(mm.) = -7142/T + 15.111$ and $\log P_{Cl_2}(mm.) = -5565/T + 11.085$. Solid soln. of $FeCl_3$ and $FeCl_2$ is not significant below 300°.
Henry Leidheiser, Jr.

Physicochemical investigation of the system Cr_2O_3-SiO_2, as part of the work to find new refractories. V. F. Smachnaya and P. Ya. Sal'dau. *Zapiski Leningrad. Gorn. Inst.* 32, No. 3, 313–16(1956).—The methods used were the ones of thermal, chem., and microscopic analysis. The results were used to plot the equil. diagram Cr_2O_3-SiO_2. From the curve of the m.ps. and by aid of the microscopic analysis it could be established that in the system Cr_2O_3-SiO_2 a chem. compd. is formed of the compn. $Cr_2O_3.3SiO_2$, which m. 1995° without decompn. Two eutectics are found, the one with Cr_2O_3 65 and SiO_2 35 mole % m. 1750°, the other with about Cr_2O_3 5 and SiO_2 95 mole % m. 1680°.
Werner Jacobson

Vapor pressures and molecular composition of vapors of the sodium fluoride-beryllium fluoride system. Karl A. Sense and Richard W. Stone (Battelle Mem. Inst., Columbus, O.). *J. Phys. Chem.* 62, 453–7(1958).—A new study of the vapor pressure of BeF_2 at 802–1025° agreed well with previous data at 802–968° (*C.A.* 48, 6766a). A heat of vaporization of 50.1 kcal./mole was calcd. Excessive scatter of the vapor-pressure data in the lower temp. region prevented a m.p. detn. of BeF_2 by the transpiration method alone. Thermal analysis yielded a value of 545°. Vapor pressures of the NaF-BeF_2 system were measured at 509–1061°. The complex $NaBeF_3$ presumably exists in the vapor phase in addn. to NaF and BeF_2. The possibility of another complex was also mentioned. A plot was given