16887r Mechanism of the thermal stabilization of poly(vinyl chloride) with metal carboxylates and epoxy plasticizers. Anderson, Donald F.; McKenzie, D. A. (Union Carbide Corp., Tarrytown, N. Y.). *Amer. Chem. Soc., Div. Org. Coatings Plast. Chem., Pap.* 1971, 31(1), 740-56 (Eng). A model for degrading *PVC* [9002-86-2] (a mixt. of *4-chloro-2-hexene* [6734-98-1] and *2-chloro-3-hexene* [28046-62-0]) underwent rapid esterification as the main reaction in the presence of a mixt. of *cadmium 2-ethylhexanoate* [2420-98-6] and *barium 2-ethylhexanoate* [2457-01-4], using *cyclohexene oxide* [286-20-4] as a model for the epoxy plasticizer. $CdCl_2$ was formed in catalytic amts. as a byproduct, and catalyzed 2-hexen-4-yl-(2-chlorocyclohexyl) ether formation. The 2 reactions and the ligand transfer reaction between $CdCl_2$ and $BaCO_3$ were related to the synergism obsd. in PVC thermal stabilization by combinations of epoxy plasticizers with Ba-Cd or Zn-Ca soap systems. The esters and chloroethers were thermally stable at 150°; at this temp., the PVC model degraded rapidly to HCl and 2,4-hexadiene.

16888s Comparison of stability tests for poly(vinyl chloride). Stiga, J. P.; Ryan, J. T.; Loan, L. D. (Bell Teleph. Lab., Inc., Murray Hill, N. J.). *Amer. Chem. Soc., Div. Org. Coatings Plast. Chem., Pap.* 1971, 31(1), 757-62 (Eng). Values obtained for the discolorization, processability, and HCl evolution of *PVC* [9002-86-2] resins (both homo- and copolymers with, and without organotin stabilizers) exhibited only the most general correlations. The resin ordering in any one test was not reproduced by any other, indicating that a test closely related to use or processing conditions should be used to assess the relative usefulness of the resins.

16889t Incipient degradation of poly(vinyl chloride). Deanin, Rudolph D.; Borzenski, Frank J.; Watterson, Arthur C., Jr. (Dep. Chem., Lowell Technol. Inst., Lowell, Mass.). *Amer. Chem. Soc., Div. Org. Coatings Plast. Chem., Pap.* 1971, 31(1), 763-9 (Eng). The incipient degradation of *PVC* [9002-86-2] was detd. by measuring the degree of unsatn. that occurred before visible discoloration using ir spectroscopy. The ir spectroscopy was a measure of incipient degradation throughout all the aging period before initial color change for Ba-Cd-Zn stabilized PVC plastisols, for degradation during the last 33% of the time before initial discoloration for the dynamic aging of Ba-Cd-Zn rigid formulations, and for the last 53% of the time before initial discoloration for Sn-stabilized plastisols. For the dynamic aging of Sn rigid formulations, ir spectroscopy measured degradation during the last 50% of the time before initial discoloration; but for Pb-stabilized systems, no ir absorption was obsd. to indicate increasing unsatn.

16890m Predicting long-term creep of polyethylene. Putans, A.; Urzhumtsev, Yu. S.; Kalnroze, Z. (USSR). *Polim. Mater. Vod. Khoz.* 1971, 28-38 (Russ). From Ref. Zh., Khim. 1972, Abstr. No. 3S772. Isothermal creep data for low-pressure *polyethylene* [9002-88-4] at const. temps. and nonisothermal creep data obtained during thermal cycling showed that creep deformation during cycling grew significantly compared with the isothermal creep at the av. temp. of the cycle; in time the nonisothermal deformations became larger than the isothermal deformation at the max. cycle temp. An approxn. of the relaxation spectra as a generalization of the Charles distribution law is given and used to predict isothermal creep at extended times, based on short term high temp. test data. When the method was applied to nonisothermal creep evaluation, there was good agreement for short-term creep, but significant error at extended duration.

16891n Factors affecting water vapor transmission through free polymer films. Swarbrick, J.; Amann, A. H.; Lindstrom, R. E. (Sch. Pharm., Univ. Connecticut, Storrs, Conn.). *J. Pharm. Sci.* 1972, 61(10), 1645-7 (Eng). Significant permeation differences from expected behavior existed with hydrophilic *cellulose acetate phthalate* (I) [9004-38-0] films when the atm. adjacent to the distal surface of the film was devoid of water vapor; no such effect was obsd. with lipophilic *poly(Bu methacrylate)* [9003-63-8] films. The effect increased with temp. and was due to partial dehydration of the I film. The method of film prepn., e.g. casting or spraying, did not affect the permeation characteristics of the I films.

16892p Structural processes during heat treatment of oriented polyethylene with straightened chains. Zubov, Yu. A.; Sukhov, F. F.; Selikhova, V. I.; Bakeev, N. F. (Fiz.-Khim. Inst. im. Karpova, Moscow, USSR). *Dokl. Akad. Nauk SSSR* 1972, 206(2), 384-6 [Phys Chem] (Russ). X-ray diffraction of cryst. *polyethylene* (I) [9002-88-4], obtained by compression (7000 kg/cm²) at 270° (Zubov, Yu. A., et al., 1970), shows that heating causes thermal expansion of its crystals in the plane (L_{110}) normal to the direction of its aligned chains. Heating I contg. crystallites with folded chains causes no change in L_{110}. This difference is caused by the differences in the space (crystal defects) available for expansion: in I contg. the aligned chain bundles the defects are large and can be filled-in during the thermal expansion, while in I contg. the folded-over chain bundles such spaces are small and insufficient for the inner expansion of the crystallites.

16893q Critical, two-dimensional tensile deformation of polymers and the mechanism of liquid permeability. Manu V. N.; Gromov, A. N. (USSR). *Dokl. Akad. Nauk SSSR* 19 206(2), 414-17 [Chem Technol] (Russ). The permeability coe (π) of unstretched or biaxially oriented *polyethylene* [9002-88-4] or *poly(tetrafluoroethylene)* (II) [9002-84-0] to toward heptane do not depend on the hydrostatic pressure (P) liq. when the deformation (λ) is sub-crit. When λ/λ_{crit} was > π of I slightly decreased while π of II increased when P w increased. These differences are explained by the absence microfissures or small defects in I and their presence in II. with large mech. anisotropy (i.e., the ratio of the elongations break in 2 perpendicular directions) acquired a large no. defects when stretched bi-directionally and have high π when th crit. λ is reached. The π detn. of biaxially oriented film provides a measure of the no. of defects in these films.

16894r Packing density of macromolecules in the polyethylene-surfactant-modified asbestos system. Revyak M. M.; Markina, A. Ya. (Beloruss. Tekhnol. Inst. im. Kirov Minsk, USSR). *Vestsi Akad. Navuk Belarus. SSR, Ser. Khim Navuk* 1972, (5), 55-8 (Belorussian). With increasing asbesto and surfactant concns., the packing d. of surfactant modifie asbestos-filled *polyethylene* [9002-88-4] (contg. 5-30% asbestos increased (from 0.946 to 1.145 g/cm³), regardless of the surfactan compn., the Brinell hardness increased, but was surfactant-comp n.-dependent, and the water absorption decreased to a absorption temp.-independent min. with OP-7 surfactant. The Brinell hardness values for OP-7 and 246 prepn. compns. were higher than those of sulforicinoleate surfactant ones. J. Malek

16895s Measurement of the normal stress difference using the Barus effect. Funatsu, Kazumori; Mori, Yohiro (Fac Eng., Univ. Kyushu, Fukuoka, Japan). *Kobunshi Kagaku* 1972, 29(9), 638-42 (Japan). The first normal stress difference of *polypropylene* [9003-07-0] at high shear rates detd. by using the Barus effect assuming the strain generated inside the nozzle completely relaxed after the fluid emerged from the nozzle agreed with the value calcd. from the exit pressure at the tube end. The result for *polyethylene* (I) [9002-88-4] was ~30% smaller than the literature values. The first normal stress differences of I extruded through a capillary and a slit varied ~20%.

16896t Contact charge-transfer absorption spectrum between polystyrene and oxygen. Tsubomura, Hiroshi; Yamamoto, Naoto; Akaishi, Satoru (Fac. Eng. Sci., Osaka Univ., Toyonaka, Japan). *Kobunshi Kagaku* 1972, 29(9), 657-61 (Japan). The absorption spectra at ~ 273 nm and <260 nm of *polystyrene* (I) [9003-53-6] film in high pressure O increased the intensity with increasing O pressure and were assigned to the contact charge transfer absorption due to the interaction between the I Ph groups and O. The direction of the transition moment of the contact charge transfer band detd. for a stretched I film was nearly perpendicular to the Ph ring plane.

16897u Crystallization kinetics of isotactic polypropylene in the presence of colloidal particles of lead. Zharinova, T. A.; Deinega, Yu. F.; Ul'berg, Z. R.; Nizhnik, V. V.; Mikhailov, B. A. (Inst. Kolloidn. Khim. Khim. Vody, Kiev, USSR). *Ukr. Khim. Zh. (Russ. Ed.)* 1972, 38(10), 989-93 (Russ). The rate of growth of spherulites in *isotactic polypropylene* [25085-53-4] was investigated in the presence of colloidal *lead* [7439-92-1] particles (≤5%) at different cryst. temps. (138-56°). The presence of colloidal particles increased the no. of crystn. nuclei and decreased the induction period of crystn. Max. growth rate (at 150°) was obsd. at 0.5% concn. of colloidal Pb; further increase in Pb concn. decreased the growth rate to a const. value about the same as at 0.1% Pb.

16898v Effect of glow discharge on the adhesion properties of fluoroplastic materials. Stepanova, I. A.; Zayats, A. I.; Kublanovskaya, A. I. (Inst. Obshch. Neorg. Khim., Kiev, USSR). *Ukr. Khim. Zh. (Russ. Ed.)* 1972, 38(10), 1018-21 (Russ). When *Ftoroplast F-4* (I) [9002-84-0] is exposed to an ionized gas discharge in partial vacuum its surface acquires CO, OH, and other groups more reactive than CF_2 groups. Such I has 10-14 kg/cm² adhesive strength to Ni or Pd. The exposure to glow discharge modifies the ir spectra of I; these changes are discussed.

16899w Structural changes before the start of necking in polyethylene. Narzullaev, B. N.; Nizamidinov, S.; Slutsker, A. I.; Yastrebinskii, A. A. (Tadzh. Gos. Univ. im. Lenina, Dushanbe, USSR). *Dokl. Akad. Nauk Tadzh. SSR* 1972, 15(8), 18-20 (Russ). X-ray diffraction shows that *polyethylene* (I) [9002-88-4] film elongated until there is necking becomes progressively more oriented. Similar conclusions are reached by observing the sepn. between marks on I surface in the vicinity of the progressing neck; the sepn. decreases as the distance from the neck increases.

16900q Velocity of sound and other condition functions of plastics. Schenkel, Gerhard (Stuttgart, Ger.). *Kunststoffe* 1972, 62(9), 575-80 (Ger). The sound propagation rates in *polystyrene* [9003-53-6], *PVC* [9002-86-2], *poly(Me methacrylate)* [9011-14-7], and *polyethylene* [9002-88-4] are calcd. as functions