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A Guide to the Literature and Patents
Concerning Polyvinyl Chloride
Technology

SECOND EDITION

Edited by
LLOYD R. WHITTINGTON

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EXHIBIT A

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1. RESINS

This topic comprises all phases of resin manufacture, handling and consumption. In some cases where the method of polymerization is not obvious by the title or annotation, this information is supplied parenthetically by the symbols "B" (bulk), "S" (suspension) and "E" (emulsion).

Grafting of other polymers onto PVC is covered here only if performed during the manufacture of the resin. Such treatments, as well as chlorination, applied to shaped articles, films, etc., are covered by topic 26.

Some confusion is evident in the literature regarding the origin of PVC. Some writers credit the French chemist Reunault with the first observation of vinyl chloride polymerization in 1838, and accordingly this reference is cited below. However, it should be noted that in today's terminology the polymers prepared and reported by Reunault would be described as those of substituted- or alpha chlorinated chlorovinyl chloride.

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INVESTIGATION OF POLYMERIZATION PROCESSES. I. I. Ostromislenskii, J. RUSS. PHYS. CHEM. SOC. 45, p. 294 (1912)

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PROCEDURE FOR MANUFACTURE OF RUBBER AND RUBBER-LIKE SUBSTANCES. (S) Ivan Ostromislenskii, German 264,123 Sept. 8, 1913

POLYMERIZATION OF VINYL MATERIALS AND THEIR USE IN MANUFACTURE OF VALUABLE INDUSTRIAL PRODUCTS. (Films and threads from PVC solutions) Chemische Fabrik Jreissman (by Fritz Klarte & Adolf Rollett) German 231,577 Feb. 2, 1916 (French 474,036; U.S. 1,491,748)

SYNTHESIS OF THE SYNTHETICAL CHLORIDE AND THE HIGH-CHLORIDE OF ERYTHRENE CAOUTCHOUC. I. I. Ostromislenskii, J. RUSS. PHYS. CHEM. SOC. 45, p. 1112 (1912)

POLYMERIZATION OF VINYL CHLORIDE. Herman Filsman, U.S. 1,425,130 July 13, 1921

PHOTOCHLORINATION OF VINYL CHLORIDE. Filsman, U.S. 1,455, PHOT. 21, p. 117 (1922)

PREPARED VINYL CHLORIDE UTILIZATION. (Polymerization and forming of films from solutions of PVC in monochlorobenzol) Ivan Ostromislenskii (to Louis A. Van Dyk) Canadian 270,725 April 10, 1927

FORMS OF VINYL CHLORIDE. (by ultraviolet light) and flexible films from plasticized solutions) Ivan Ostromislenskii, U.S. 1,721, 270 July 16, 1928

ARTICLE OF POLYMERIZING VINYL COMPOUNDS (in presence of acetone and lead tetraethyl catalyst) I. O. Young & S. D. Douglas (to Carbide & Carbon Chemicals Corp.) U.S. 1,775,322

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REGARDING HIGH POLYMER COMPOUNDS. POLYVINYL BROMIDE (and polyvinyl chloride) H. Staudinger, R. Brunner & M. Feinst, HELVETICA CHIMICA ACTA 13, p. 805 (1930)

METHOD OF OBTAINING VARIOUS POLYMERIZED VINYL CHLORIDE MODIFICATIONS. Ivan Ostromislenskii (to L. A. Van Dyk) U.S. 1,791,009 Feb. 3, 1931

IMPROVEMENTS IN PROCESS OF POLYMERIZING VINYL DERIVATIVES. E. I. du Pont de Nemours & Co. British 319,568 March 23, 1931

PROCESS OF PRODUCING THE ALPHA POLYMER OF VINYL CHLORIDE. E. I. du Pont de Nemours & Co. British 319,591 March 23, 1931

IMPROVEMENTS IN THE PRODUCTION OF VINYL HALIDES (vinyl chloride monomer from HCl and acetylene with activated carbon catalyst) J. P. Baxter and I.C.I. Ltd. British 349,017 May 12, 1931

SYSTEMATICOLOGY OF CELLULOSE BASED ON THEIR VISCOSITIES IN SOLUTION. ("x factor" used in vinyl polymerization) H. Fikentscher, CELLULOSECHEMIE 13, p. 56 (1932)

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- POLYMERIZATION OF VINYL CHLORIDE, ETC. Leland C. Shriver (to Carbide & Carbon Chemicals Corp.) British 397,364 Aug. 24, 1933 (German 636,315)
- POLYMERIZATION PRODUCTS. (copolymers with acrylic compounds) H. Fikentscher (to I. G. Farbenindustrie A.-G.) U.S. 1,933,052 Oct. 31, 1933 (German 605,237)
- VINYL RESIN. (solution copolymerization of vinyl chloride and vinyl acetate) E. W. Reid (to Carbide & Carbon Chemicals Co.) U.S. 1,935,577 Nov. 14, 1933
- POLYMERIZING VINYL COMPOUNDS. (with acetyl benzoyl peroxide catalyst) L. C. Shriver (to Carbide & Carbon Chemicals Co.) U.S. 1,938,870 Dec. 12, 1933
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- CLASSIFICATION OF VINYL RESINS. M. C. Read (to Carbide & Carbon Chemicals Co.) U.S. 2,137,627 Nov. 22, 1938
- PRODUCTION OF SYNTHETIC RESINS FOR MOLDING. A. Renfrew & Imperial Chemical Industries Ltd. British 498,396 Jan. 6, 1939
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- POLYMERIZATION PRODUCTS OF VINYL CHLORIDE. (with 0.5 - 3% of an acrylate or acrylamide derivative) Hans Fikentscher & Walter Franke (to I. G. Farbenindustrie) U.S. 2,147,154 Feb. 14, 1939
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- EMULSION POLYMERIZATION OF VINYL CHLORIDE. (continuously, followed by spray drying) I. G. Farbenindustrie, A.-G. Brit. 503,788 Apr. 13, 1939 (French 827,401)
- POLYMERIZED VINYL COMPOUNDS. (in inert organic solvent, e.g. benzene, with a reaction product of ethylene oxide as emulsifying agent.) I. G. Farbenindustrie, A.-G. German 675,146 May 2, 1939
- TREATING POLYVINYL HALIDES. (by heating with a metal salt or oxide to render less soluble and less thermoplastic) S. L. Brown (to Goodrich) U.S. 2,157,997 May 9, 1939
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- PRODUCTION OF RESINS BY POLYMERIZATION OF VINYL CHLORIDE. ORG. CHEM. IND. (U.S.S.R.) 1, p. 662 (1940)
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- POLYMERIZING VINYL CHLORIDE. (at temperature below 60°C. with hydrogen peroxide catalyst) A. J. Downes (to Carbide & Carbon Chemicals Co.) U.S. 2,345,659 April 4, 1944
- VINYL CHLORIDE AND VINYL ACETATE COPOLYMER. A. J. Downes & J. R. Kernan (to Carbide & Carbon Chemicals Co.) U.S. 2,345,660 April 4, 1944
- VINYL CHLORIDE COPOLYMERS (with vinylidene chloride). Winfield Scott & R. B. Seymour (to Wingfoot Corp.) U.S. 2,348,154 May 2, 1944
- CHLORINATION OF POLYMERIC MATERIALS. (in solution of carbon tetrachloride and tetrachlorethane). W. J. R. Evans (to I. C. I. Ltd.) U.S. 2,352,525 June 27, 1944
- NEW NAME BRAND VINYL RESINS. (Geon) N. S. Houston. MOD. PLASTICS 21, No. 10, p. 83 (June, 1944)
- RUBBER-LIKE PLASTICS FROM POLYVINYL COMPOUNDS. D. M. Davies. TRANS. INST. RUBBER IND. 20, No. 1, p. 29 (June 1944)
- SYNTHETIC RESINS. (vinyl chloride is purified by treatment with an alkali metal hydroxide solution before polymerization) M. Mader (to Allen Property Custodian). U.S. 2,356,562 Aug. 22, 1944
- COPOLYMERS OF VINYL CHLORIDE. (with vinylidene chloride and vinyl acetate) Wingfoot Corp. British 563,720 Aug. 28, 1944
- CONJOINT POLYMERIZATION PRODUCTS. (vinyl chloride and allyl chloride) E. W. Moffett & R. E. Sabin (to Pittsburgh Plate Glass Co.) U.S. 2,356,871 Aug. 29, 1944
- POLYMERIZATION OF VINYL HALIDES, ETC. (in presence of a water-soluble compound of sulfur and oxygen and a complex iron salt) C. F. Fryling (to B. F. Goodrich Co.) U.S. 2,356,925 Aug. 29, 1944
- POLYMERS. (vinyl chloride copolymerized with a tetrahydrophthalic acid ester) M. Kopf & W. Rapp (to General Aniline & Film Corp.) U.S. 2,359,038 Sept. 26, 1944
- COPOLYMERS OF VINYL HALIDES. (with vinyl bromide) W. Scott & R. B. Seymour (to Wingfoot Corp.) U.S. 2,361,504 Oct. 31, 1944
- COPOLYMERIZATION OF VINYL CHLORIDE AND VINYL FLUORIDE. C. A. Thomas (to Monsanto). U.S. 2,362,960 Nov. 14, 1944
- CONTINUOUS EMULSION POLYMERIZATION. M. Fikentscher (to General Aniline & Film Corp.) U.S. 2,363,951 Nov. 28, 1944
- POLYMERIC VINYL COMPOUNDS (resin is precipitated from polymerization emulsion with a water-soluble lead salt). J. R. Lewis, L. B. Morgan & J. T. Watts (to I. C. I. Ltd.) U.S. 2,364,227 Dec. 5, 1944
- POLYMERIZATION OF VINYL COMPOUNDS. C. M. Alexander & F. X. Schoenfeld (to B. F. Goodrich Co.) U.S. 2,365,506 Dec. 19, 1944
- POLYMERIZATION OF VINYL HALIDES. (diacyl peroxide catalysts) C. M. Alexander & M. Tucker (to B. F. Goodrich Co.) U.S. 2,366,306 Jan. 2, 1945
- THE METHOD OF POLYMERIZATION IN SUSPENSION. W. F. Bohenstein. POLYMER BULL. 1, No. 1, p. 13 (1945)
- MECHANISM OF VINYL POLYMERIZATION. I. ROLE OF OXYGEN. Carl E. Barma. J. AM. CHEM. SOC. 67, p. 217 Feb. 1945
- ADVANCES IN PLASTICS DURING 1944. (Consumption figures and applications of vinyls) O. M. Kline. INDIA RUBBER WORLD 111, No. 6, p. 694 (March 1945)
- POLYMERIZATION OF VINYL ESTERS IN PRESENCE OF A HYDROPHILIC COLLOID. Shaminigan Chemicals, Ltd. British 568,535/6 April 28, 1945
- POLYMERIZATION OF VINYL HALIDES. J. W. Britton & R. C. Desser (to Dow Chemical Co.) U.S. 2,377,752 June 5, 1945
- VINYL POLYMERIZATION PRODUCTS. (peroxide catalyst) Distillers Co., Ltd., H. P. Staudinger et al. British 570,198 and /-207 June 27, 1945

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1. RESINS

1945

POLYVINYL CHLORIDE: POLYMERIZATION. J. Prat. MEN. SERV. CHIM. ETAT 12, p. 315 (1-45)

EMULSION POLYMERIZATION OF VINYL HALIDES. (in aqueous medium containing a salt of perdisulphuric acid and an acid-stable dispersing agent) Du Pont. British 570,330 July 3, 1945

INTERPOLYMERS OF VINYL CHLORIDE AND FUMARIC ESTERS. (by process of 570,330) Du Pont. British 570,331 July 3, 1945

VINYL POLYMERIZATION PRODUCTS. (in presence of hexamethylene-triperoxide-diamine) Distillers Co., Ltd., M. P. Staudinger & M. M. Hutchinson British 570,564 July 12, 1945

POLYMERIZATION OF VINYL COMPOUNDS. (3) M. P. Staudinger et al (to Distillers Co., Ltd.) U.S. 2,381,561 Aug. 7, 1945

VINYL HALIDE COPOLYMERS. (with dialkyl fumarates) Wingfoot Corp. British 571,767 Aug. 21, 1945

VINYL CHLORIDE ETC. POLYMERS. (in presence of dicrotonyl peroxide and ethylene oxide) Distillers Co., Ltd., J. J. P. Staudinger & M. D. Cooke. British 572,767 Oct. 23, 1945

PLASTICS IN GERMANY, 1939-1945. (Production, processing & applications of PVC) J. H. Kline MOD. PLASTICS 23, No. 2, p. 152A (Oct. 1945) and p. 157 (Dec.)

POLYMERIZATION IN EMULSION. M. M. Collins (to Shawinigan Chemicals Ltd.) U.S. 2,383,600 Nov. 6, 1945

VINYL POLYMERIZATION PRODUCTS. (in presence of a water-soluble persulphate and an oxygen-absorbing compound) R. G. R. Bacon, L. B. Morgan & I. C. I. Ltd. British 573,365 Nov. 19, 1945

GASEOUS SOLUTIONS OF SOLID POLYMERS. (separating different molecular weight fractions) E. Hunter, R. B. Richards & I. C. I., Ltd. British 574,031 Dec. 21, 1945

POLYMERIZATION OF VINYL CHLORIDE. (in presence of a thiosulphate to absorb oxygen) I. C. I. Ltd. (by R. G. R. Bacon, L. B. Morgan & W. B. Whatley) British 574,882 Jan. 8, 1946

PRODUCTION OF POLYVINYL CHLORIDE IN THE U.S.S.R. P. I. Pavlovich. LEKAYA PRON., No. 1, p. 18 (1946)

EMULSION POLYMERIZATION OF VINYL CHLORIDE. Lonsa Elek. & Chem. Fabriken A.-G. Swiss 239,764/-5 Feb. 18, 1946 Cf. 240,603

HEAT POLYMERIZATION OF VINYL HALIDES. F. K. Schoenfeld (to B. F. Goodrich Co.) U.S. 2,395,384 Feb. 19, 1946

PLANS MARVINOL PRODUCTION. INDIA RUBBER WORLD 111, No. 6, p. 828 (March 1946)

INTRAMOLECULAR REACTIONS IN VINYL POLYMERS AS A MEANS OF INVESTIGATION OF THE PROPAGATION STEP. E. Herz, T. Alfrey & G. Goldfinger. J. POLYMER SCI. 1, No. 2, p. 75 (March 1946)

MECHANISM OF VINYL POLYMERIZATION. IX. SOME factors affecting copolymerization. Charles

J. Price. J. POLYMER SCI. 1, No. 2, p. 83 (March 1946)

DETERMINATION OF POLYMER-LIQUID INTERACTION BY SWELLING MEASUREMENTS. Paul Doty & Helen S. Cable. J. POLYMER SCI. 1, No. 2, p. 90 (March 1946)

COPOLYMERS OF VINYL CHLORIDE AND TRICHLOROETHYLENE. C. W. Cass (to Du Pont). U.S. 2,397,724 April 2, 1946

VINYL CHLORIDE-TRICHLOROETHYLENE COPOLYMERS. I. C. I., Ltd. British 577,511 May 21, 1946

VINYL AND VINYLIDENE CHLORIDE POLYMERS AND COPOLYMERS. Distillers Co., Ltd., J. J. P. Staudinger & D. A. Bennett. British 578,849 July 15, 1946

POLYMERIZATION OF VINYL CHLORIDE WITH FUMARIC ESTERS. R. W. Arnold (to Du Pont). U.S. 2,404,780 July 30, 1946

VINYL CHLORIDE-ACRYLIC ESTER COPOLYMERIZATION. (with emulsifier, e.g. sodium salt of sulfonated paraffin oil) R. W. Arnold, et al (to Du Pont) U.S. 2,404,791 July 30, 1946

VINYL POLYMERS. D. C. Coffman & P. C. McGraw (to Du Pont) U.S. 2,404,791 July 30, 1946

IMPROVING PLASTIC FLOW OF VINYL RESINS. (Polymerizing in presence of 0.3% octyl mercaptan to yield better flow in injection molding) E. I. du Pont de Nemours & Co. British 579,353 July 31, 1946

VINYL COPOLYMERS (vinyl chloride is polymerized to slight degree before adding comonomer) G. A. Kotlyarskii. U.S.S.R. 66,687 July 31, 1946

ACRYLIC ACID AND ESTERS. (for interpolymerization with vinyl chloride) I. C. I., Ltd. British 579,855 Aug. 19, 1946

COPOLYMERIZATION OF VINYL COMPOUNDS. (vinyl chloride, vinylidene chloride and ethyl methacrylate, with mixture of ferric chloride and nitric acid as activator) E. C. Britton & W. J. LeFebvre (to Dow Chemical Co.) U.S. 2,407,946 Sept. 17, 1946

COLOR-STABLE VINYL CHLORIDE POLYMERS. (Emulsion-polymerizing in presence of formaldehyde) F. W. Denny & Imperial Chemical Industries, Ltd. British 580,731 Sept. 18, 1946

VINYL RESINS (Bound Brook plant of Bakelite Corp.) CHEM. AGE 22, No. 122, p. 379 (Sept. 28, 1946)

MEASUREMENT OF VISCOSITY OF POLYVINYL CHLORIDES. M. Fournier, X. Thiess & J. Hardman. IND. PLASTIQUES 2, No. 9, p. 268 (Sept. 1946)

CHLORINATED RESINS (copolymers of vinyl chloride and vinylidene chloride) O. W. Cass (to Du Pont). U.S. 2,408,608 Oct. 1, 1946

RESINS OF HIGH CHLORINE CONTENT. (chlorination of vinyl chloride-trichloroethylene copolymers) O. W. Cass (to Du Pont) U.S. 2,408,609 Oct. 1, 1946

VINYL CHLORIDE POLYMERS AND COPOLYMERS. (in aqueous medium containing a water-soluble acid and an alcohol) Distillers Co., Ltd. British 581,344 Oct. 15, 1946

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I. RESINS

COPOLYMERS OF VINYL CHLORIDE AND ESTERS OF
MALEIC AND/OR FUMARIC ACID. Distillers' Co.
Ltd., J. J. P. Staudinger & C. A. Brighton.
British 581,995 Oct. 31, 1946

CHLORINATED COPOLYMER OF VINYL CHLORIDE AND
TRICHLOROETHYLENE. I. C. I., Ltd. British
582,348 Nov. 13, 1946

OXYGEN AS ACTIVATOR AND DEACTIVATOR OF
POLYMERIZATION. M. Neueck. MOD. PLASTICS 21,
No. 4, p. 158 (Dec. 1946)

POLYMERIZATION OF VINYL CHLORIDE. F. W.
Deasy (to I. C. I. Ltd.) U.S. 2,418,934
Jan. 28, 1947

PHOTOPOLYMERIZATION. (in presence of an
organic disulphide) I. C. I., Ltd. British
585,179 Jan. 30, 1947

THE RAW MATERIALS SITUATION: VINYL RESINS.
MOD. PLASTICS 22, No. 3, p. 108 (Jan. 1947)

POLYMERIZATION. (in presence of an oxide of
styrene or of indene, or of one of their
derivatives) Distillers Co., Ltd., J. J. P.
Staudinger & C. A. Brighton. British 586,715
March 28, 1947

VINYL RESINS AS CONSUMERS OF C_2H_2 AND C_2H_4 .
E. H. Atlas & R. S. Ariss. CHEM. ENG. 24,
No. 3, p. 101 (March 1947)

DISPERSION POLYMERIZATION. Imperial Chemical
Industries Ltd. (by Du Pont) British 586,796
April 1, 1947

COPOLYMERS (of vinyl chloride and trialkyl
ester of succinic acid). F. W. Cox (to Wing-
foot Corp.) U.S. 2,419,122 April 15, 1947

POLYMERIZATION CATALYSTS. (E) V. L. Felt &
F. W. Shaver (to E. F. Goodrich Co.) U.S.
2,419,347 Apr. 22, 1947

VINYL CHLORIDE/ITACONIC ESTER COPOLYMERS.
British Thomson-Houston Co., Ltd. British
587,449 April 25, 1947

POLYMERIZATION (in presence of an
oxidizable sulfur dioxide and free oxygen)
A. Soake, Roberts & Co., Ltd. & E. T. D.
Sully. British 587,455 April 25, 1947

GERMAN PLASTICS TECHNOLOGY VI. PRODUCTION OF
POLYVINYL CHLORIDE AT BURGHAUSEN AND
LUDWIGSHAVEN. (FIAT 862). BRITISH PLASTICS
12, No. 215, p. 175 (April 1947)

POLYMERIZATION. (polymer of ethylene oxide as
a protective colloid) Distillers Co., Ltd.,
J. J. P. Staudinger et al. British 587,880
May 8, 1947

VINYL CHLORIDE COPOLYMER. (with acrylonitrile)
L. C. Shriver & O. H. Frenon (to Carbide &
Carbon Chemicals Co.) U.S. 2,420,330 May 13,
1947

EMULSION POLYMERIZATION. (in presence of a
peroxy compound, emulsifying agent and a
soluble copper salt) I. C. I. Ltd. British
589,264 June 16, 1947

STYRENE-VINYL CHLORIDE POLYMERS. M. M.
Brubaker et al (to Du Pont) U.S. 2,422,392
June 17, 1947

VINYL POLYMERS AND COPOLYMERS. (B) Distillers

Co., Ltd., J. J. P. Staudinger & M. D. Cooke.
British 589,337 June 18, 1947

BRITISH PATENT - CONTAINING POLYMERS.
(Softening point and solvent resistance of
IVC are improved by treating with sulfur)
E. I. du Pont de Nemours & Co. British
590,160 June 18, 1947

IMPROVED POLYVINYL CHLORIDE COMPOSITIONS.
(Resins for plastisols with improved viscosity
stability made by spray-drying at elevated
temperatures). Imperial Chemical Industries,
Ltd. (by L. B. Morgan). British 589,715
June 27, 1947

A GENERAL THEORY OF THE MECHANISM OF EMULSION
POLYMERIZATION. W. D. Harkins. J. AM. CHEM.
SOC. 69, p. 1428 (June 1947)

OUTLOOK IN VINYL PRODUCTION. F. K. Schoenfeld
CANADIAN PLASTICS 2, No. 7, p. 24 (July 1947)

THE TEMPERATURE DEPENDENCE OF THE OSMOTIC
PRESSURE OF POLYVINYL CHLORIDE SOLUTIONS.
Paul Doty & Eli Mishuk. J. AM. CHEM. SOC.
69, p. 1631 (July 1947)

PHOTOCHEMICAL CHLORINATION OF POLYVINYL
CHLORIDE. J. Chapman & J. W. C. Crawford (to
I. C. I. Ltd.) U.S. 2,426,080 Aug. 19, 1947

COPOLYMERS BASED ON VINYL CHLORIDE. M. Sans.
IND. PLASTIQUES 3, No. 8, p. 281 (Aug. 1947)

COPOLYMERS. (with a diester of endomethylene
tetrahydrophthalic acid) Distillers Co., Ltd.,
J. J. P. Staudinger & C. A. Brighton. British
591,944 Sept. 3, 1947

VINYL AND VINYLIDENE CHLORIDE POLYMERS.
Distillers Co., Ltd., J. J. P. Staudinger &
M. D. Cooke. British 595,551 Dec. 9, 1947

INSOLUBILIZING POLYMERS SOLUBLE IN ORGANIC
SOLVENTS. (copolymers of vinyl chloride and
dialkyl fumarates are treated with a peroxide
and exposed to actinic light) Du Pont.
British 595,689 Dec. 12, 1947

PHOTOPOLYMERIZATION. R. F. Hayes (to Monsanto
Chemical Co.) U.S. 2,433,047 Dec. 23, 1947

POLYMERIZATION OF VINYL. M. Sittenfeld.
CHEM. ENG. 24, No. 12, p. 129 (Dec. 1947)

BENCH SCALE EQUIPMENT AND TECHNIQUES FOR PREP-
ARATION OF HIGH-MOLECULAR WEIGHT ADDITION
POLYMERS. A. I. Goldberg. IND. ENG. CHEM. 39,
No. 12, p. 1570 (Dec. 1947)

DETERMINATION OF CHLORINE IN RESINS OBTAINED
FROM POLYVINYL CHLORIDE COMPOSITIONS.
J. Maslam & W. W. Soppet. J. SOC. CHEM. IND.
67, No. 1, p. 33 (Jan. 1948)

PREPARATION, PROPERTIES AND APPLICATIONS OF
GEON PASTE RESIN. M. H. Burleson. RUBBER AGE
(NY) 62, No. 4, p. 417 (Jan. 1948)

RECOVERY OF FINELY DIVIDED POLYMER FROM
AQUEOUS EMULSION. A. J. Gracia (to Wingfoot
Corp.) U.S. 2,435,778 Feb. 10, 1948

COPOLYMERIZATION. IV. THE VALIDITY OF THE TRI-
POLYMER EQUATION FOR THE SYSTEM: STYRENE-
VINYL CHLORIDE-METHYL ACRYLATE AND STYRENE-
VINYL CHLORIDE-ACRYLONITRILE. E. C. Chapin,
G. E. Ham & R. G. Fordyce. J. AM. CHEM. SOC.
70, p. 538 (Feb. 1948)

1. RESINS

- VINYL AND VINYLIDENE CHLORIDE POLYMERS AND COPOLYMERS. (E) Distillers Co., Ltd. British 596,890 March 1, 1948
- ETHEROID POLYMER STABILIZATION (by polymerizing in presence of a lead compound) Distillers Co., Ltd. British 599,424 March 12, 1948
- POLYMERIZING IN AQUEOUS MEDIA. I. C. I., Ltd. British 599,472 March 13, 1948
- PURIFICATION OF VINYL HALIDE AND VINYLIDENE HALIDE POLYMERS. (by heating in acyl alcohol to remove residual peroxide catalyst) G. W. Stanton (to Dow Chemical Co.) U.S. 2,438,480 March 23, 1948
- STABILIZED POLYMERS. (emulsion polymerization in presence of a silicate, e.g. calcium) B. F. Goodrich Co. British 600,752 April 19, 1948
- VINYL AND VINYLIDENE HALIDE POLYMERIZATION. (E) Distillers Co., Ltd., J. J. P. Staudinger & B. K. Kelly. British 600,904/-305/-950 April 22, 1948
- CONTINUOUS POLYMERIZATION IN GERMANY. R. D. Dunlop & F. E. Reese. IND. ENG. CHEM. 40, No. 4, p. 654 (April 1948)
- POLYMERIZATION OF VINYL CHLORIDE. J. Matsumoto. CHEM. HIGH POLYMERS (Japan) 2, p. 130 (1948)
- NEW TENDENCIES IN THE CHEMISTRY OF HIGH POLYMERS. (discussion of polymerization) M. Sano. IND. PLASTIQUES 2, No. 6, p. 268 (June 1948)
- EMULSION POLYMERIZATION. N. V. de Bataafsche Petroleum Maatschappij. British 604,412 July 2, 1948
- POLYVINYL HALIDES. (polymerized in aqueous emulsions of low pH, by acidification) N. V. de Bataafsche Petroleum Maatschappij. British 605,516/-7 July 26, 1948
- POLYVINYL CHLORIDE. (from monomer prepared by pyrolysis of 1, 2 - dichloroethane) N. V. de Bataafsche Petroleum Maatschappij. British 605,606 July 27, 1948
- METHOD FOR POLYMERIZING. R. C. Reinhardt (to Dow Chemical Co.) U.S. 2,445,970 July 27, 1948
- COPOLYMERIZATION. V. RELATIVE MONOMER ADDITION RATES IN VINYL COPOLYMERIZATION. R. G. Fordyce, E. C. Chapin & G. E. Ham. J. AM. CHEM. SOC. 70, p. 2489 (July 1948)
- POLYMERIZATION OF VINYL CHLORIDE. (in bulk, with peroxide catalyst in presence of HCl - fixing salts.) Soc. de Saint - Gobain. British 606,119 Aug. 6, 1948
- POLYMERIZATION OF VINYL AND VINYLIDENE CHLORIDES. R. P. Staudinger & M. D. Cooke (to Distillers Co., Ltd.) U.S. 2,447,289 Aug. 17, 1948
- POLYMERIZATION PROCESS. E. I. du Pont de Nemours & Co. British 607,734/-4 Sept. 6, 1948
- COPOLYMERIZATION. (with isobutylene, etc.) N. V. de Bataafsche Petroleum Maatschappij. British 608,721 Sept. 22, 1948
- POLYMERIZING CHLORETHYLENES (E) B. F. Goodrich Co. British 609,239 Sept. 23, 1948
- CHLORINATED COPOLYMERS OF VINYL CHLORIDE (with diesters of an ethylene alpha-beta-dicarboxylic acid) Distillers Co. Ltd., C. A. Brighton & J. J. P. Staudinger. British 609,693 Oct. 5, 1948
- VINYL CHLORIDE COPOLYMERS (with diester of citraconic or mesaconic acid) Distillers Co. Ltd., M. D. Cooke & J. J. P. Staudinger. British 609,940 Oct. 8, 1948
- EMULSION POLYMERIZATION (in situ, on fibrous textile material) Wolsey, Ltd., & P. Alexander. British 611,329 Nov. 4, 1948
- EMULSION POLYMERIZATION. (by exposure to high frequency mechanical vibration) Wolsey, Ltd., & P. Alexander. British 611,330 Nov. 4, 1948
- COPOLYMER OF ISOPROPENYL ACETATE AND VINYL CHLORIDE. R. L. Hasche & E. M. McMahon (to Eastman Kodak Co.) U.S. 2,453,317 Nov. 9, 1948
- CONTINUOUS EMULSION POLYMERIZATION. N. V. de Bataafsche Petroleum Maatschappij. British 612,331 Nov. 11, 1948
- POLYMERIZATION PROCESS. (oxygen-liberating catalyst) E. I. du Pont de Nemours & Co. British 613,963 Dec. 5, 1948
- COAGULATING AQUEOUS EMULSIONS OF POLYMERS. (sprayed droplets are collected in a non-solvent liquid, e.g. methanol) J. Downing. British 615,395 Jan. 5, 1949
- POLYVINYL ESTERS. (vinyl chloride and acetate polymerized in aqueous medium) Gavaert Photo-Producten N. V. British 615,429 Jan. 6, 1949
- VINYL COPOLYMER AND PROCESS FOR ITS PRODUCTION. R. W. Quarles (to Carbide & Carbon Chemicals Corp.) U.S. 2,458,639 Jan. 11, 1949
- ON THE POLYMERIZATION OF VINYL CHLORIDES. E. Jenckel, H. Eckmann & B. Rumbach. MAKROMOL. CHEM. 2, No. 1, p. 15 (1949)
- A PRACTICAL THEORY OF COPOLYMERIZATION. G. M. Smith. PROC. N. DAKOTA ACAD. SCI. 1, p. 37 (1949)
- HOMOGENEOUS COPOLYMERS (with methyl methacrylate) N. V. de Bataafsche Petroleum Maatschappij. British 617,891 Feb. 14, 1949
- POLYMERIZATION PROCESS. (in presence of an ester of hyponitrous acid) I. C. I. Ltd., I. Marshall et al. British 618,168 Feb. 17, 1949
- CONCENTRATING SYNTHETIC LATICES. (creaming agents) B. F. Goodrich Co. British 618,299 Feb. 18, 1949
- POLYMERIZATION PROCESS. (redox catalyst-activator systems for vinyl chloride-acrylate copolymerization.) N. M. Brubaker & R. A. Jacobson (to Du Pont). U.S. 2,462,354 Feb. 22, 1949
- POLYMERIZING VINYL HALIDES IN DISPERSION WITH A FER DI SULFURIC ACID AS CATALYST AND AN OXIDIZABLE SULFOXY COMPOUND AS ADJUVANT. Louis Haimbeck, Jr. (to DuPont) U.S. 2,462,422 Feb. 22, 1949

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I. RESINS

TREATMENT OF POLYVINYL CHLORIDE (with caustic potash and a glycol ester, to remove hydrogen chloride) British Celanese Ltd. (by J. Downing) British 618,502 March 1, 1949

VINYL CHLORIDE COPOLYMERS. (with acrylonitrile) Carbide & Carbon Ltd. (by L. C. Shriver & G. M. Freeman) Canadian 454,974 March 8, 1949

VINYL CHLORIDE POLYMERS. (E) W. L. J. de Nis (to N. V. de Bataafsche Petroleum Maatschappij) Dutch 62,567 Mar. 15, 1949

EMULSION POLYMERIZATION (control of monomer concentration) N. V. de Bataafsche Petroleum Maatschappij. British 619,513 and /-870 March 16, 1949

POLYMERIZATION OF VINYL CHLORIDE. (in presence of soluble persulphates and thiosulphates) I. C. I. Ltd. Swiss 257,297 April 1, 1949

VINYL CHLORIDE - FUMARIC ESTER COPOLYMER. Canadian Industries Ltd. & Du Pont (by H. W. Arnold) Canadian 455,870 April 12, 1949

PHOTO POLYMERIZATION. E. I. du Pont de Nemours & Co. British 622,374 May 2, 1949

GLYCIDYL ESTER COPOLYMERS. (with vinyl chloride) H. P. Staudinger et al (to Distillers Co. Ltd.) U.S. 2,470,324 May 17, 1949

PREPARATION OF GRANULAR POLYMERS OF VINYL HALIDES. M. Baer (to Monsanto) U.S. 2,470,908/-911 May 24, 1949

COPOLYMER DISPERSIONS. B. Cyriak. FARBE U. LACK. 55, No. 5, p. 143 (May 1949)

PREPARATION OF SOLUBLE POLYVINYL CHLORIDES. (in autoclave at pressure lower than the saturation pressure of the monomer) Cie. de Produits Chim. et Elec. Alais. French 946,750 June 13, 1949

METHOD AND CATALYSTS FOR POLYMERIZING VINYL AND VINYLIDENE COMPOUNDS. J. W. Britton & R. C. Dossier (to Dow Chemical Co.) U.S. 2,473,005 June 14, 1949

EMULSION POLYMERIZATION IN PRESENCE OF IONIZABLE SILVER COMPOUNDS AND AMMONIA. G. W. Smith (to E. F. Goodrich Co.) U.S. 2,473,548/-9 June 21, 1949

CATALYZED POLYMERIZATION OF ETHYLENIC COMPOUNDS. E. I. du Pont de Nemours & Co. British 626,155 July 8, 1949

SUSPENSION POLYMERIZATION. (hydrous magnesium silicate dispersing agent) Rohm & Haas Co. (by H. T. Heher & F. J. Glanis) Canadian 458,112 July 12, 1949

POLYMERIZATION OF VINYL COMPOUNDS IN AN AQUEOUS DISPERSION. M. Baer (to Monsanto Chemical Co.) U.S. 2,476,474 July 19, 1949

EMULSION POLYMERIZATION. (in series of reaction zones) W. L. J. de Nis (to Shell Development Co.) Canadian 458,648 Aug. 2, 1949

VINYL POLYMER LATTICES. (in presence of a seed latex) E. F. Goodrich Co. British 627,265 Aug. 4, 1949

EMULSION POLYMERIZATION. (with alkali metal

salts of organic compounds that act as emulsifying agents) E. C. George (to Hercules Powder Co.) U.S. 2,477,025 Aug. 16, 1949

PROCESS FOR EMULSIFYING POLYMERIZABLE COMPOUNDS AND EFFECTING POLYMERIZATION WITH SAID EMULSIONS. E. C. H. Kolvoort & G. Akkerman (to Shell Development Corp.) U.S. 2,479,241 Aug. 16, 1949

COAGULATION OF POLYMER DISPERSIONS. N. V. de Bataafsche Petroleum Maatschappij. British 627,684 Aug. 17, 1949

POLYMERIZATION OF VINYL CHLORIDE. Canadian Industries, Ltd. & I. C. I. Ltd. Canadian 458,298 Aug. 30, 1949

EMULSION POLYMERIZATION METHODS. N. V. de Bataafsche Petroleum Maatschappij. French 949,919 Sept. 13, 1949

POLYMERIZATION OF VINYL HALIDES IN AQUEOUS DISPERSION. A. Baer (to Monsanto Chemical Co.) U.S. 2,483,060 Oct. 4, 1949

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A BIBLIOGRAPHY ON THE TOXICOLOGY OF VINYL CHLORIDE AND POLYVINYL CHLORIDE

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Because of the widespread interest in the subject of vinyl chloride and polyvinyl chloride, it was deemed useful to gather together the available bibliographic material in order to provide a background for current research and evaluation. Three surveys of the literature were made for this purpose, one by the National Institute for Occupational Safety and Health, another by the Bell Laboratories and the last by the Environmental Science Laboratory of the Mount Sinai School of Medicine of the City University of New York. Since the three were approached from somewhat different perspectives and each contained some references not cited by the others, it was considered useful to combine them in a uniform listing. We have also included the papers printed in this monograph.

The material is presented in an alphabetical listing by first author, together with sequential numbering. Before the listing, we have subdivided the information into what we conceive as the more important classes that an investigator may want delineated. We have indicated by number which references are probably the more important for providing information on these subjects in relation to vinyl chloride.

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