Object

A series of basic lead silico chromate pigments were prepared with a variable ratio of lead oxide and chromium oxide. The object of this report is to compare the electrodeposition properties and the salt fog exposure properties of the experimental pigments with Oncor M50.

Conclusions

A. Electrodeposition Properties

1. Periodic inspections of the electrocoating baths indicate superior suspension properties for the experimental pigments by comparison with Oncor M50.

2. Throwing power of the S50-C2 Lot 101366 experimental pigment and the S50-C3 Lot 101466 experimental pigment is rated equal to Oncor M50.

3. Both experimental pigments produced cured films rated equal to Oncor M50 in gloss and hardness. Hiding power of the two experimental pigments was better when compared to Oncor M50.

4. Both experimental pigments provided excellent can stability. No noticeable drift occurred from an original pH 7.2. Both experimental pigments plated satisfactorily after 30 days shelf life.

B. Performance Properties (Salt Fog)

1. Five hundred hours (500 hrs.) salt fog resistance test on 4" x 8" Bonderite 100 panels, 4" x 12" Bonderite "templet" panels, and tube throwing power panels shows both experimental pigments to be superior to Oncor M50. Experimental pigment S50-C2 Lot 101366 was rated slightly higher than S50-C3 Lot 101466 in blister resistance.

Experimental Details

The pigment samples compared in this experiment are described as follows:

S50-C2 Lot 101366	D.P. 417-37-54
S50-C3 Lot 101466	" 417-37-54
Oncor M50-Lot 175274.	

The two experimental lead silico chromates can be further described as follows:

(1) Pigment S50-C2, Lot 101366 (D.P. 417-37-54) contains:

SiO_2	50%
PbO	43.50%
CrO_3	6.50%

Object:

A series of basic lead silico chromate pigments were prepared having a fixed ratio of lead oxide and chromium oxide. Silica content was the single variable, ranging from 50% to 90% by weight. The object of this report is to compare the electrodeposition properties and the exposure properties of the experimental pigments with Oncor M50.

Conclusions:

A. Electrodeposition Properties

(1) Visual inspection of electrocoating baths indicates superior suspension properties for the experimental pigments by comparison with Oncor M50.

(2) Throwing power of the S50 and S60 experimental pigments is rated equal to Oncor M50. Throwing power of the S70, S80, and S90 experimental pigments is rated inferior to Oncor M50. Throwing power by both the "triplet" method and the "tube" method decreased with increasing silica content.

(3) All experimental pigments produced cured films rated equal to Oncor M50 before exposure.

(4) All experimental pigments provided excellent can stability for 30 days. After 30 days, pH drift occurred. The initial pH 7.2 drifted to pH 5.9. Electrocoating baths failed to plate at pH 5.9. Oncor M50 does not drift and plates satisfactorily after 30 days shelf life. In this project increasing the pH to the original value of 7.2 failed to revive the plating properties of the bath.

B. Performance Properties

(1) Two hundred and fifty hours (250 hrs.) salt fog resistance test on 4" x 8" Bonderite 100 panels, 4" x 12" Bonderite 100 "templet" panels, and tube throwing power panels shows Oncor M50 to be superior when compared to the experimental pigments. Salt fog resistance decreases with increasing silica content.

for grafting reactions, e.g. with ethylene oxide or sodium salts of unsaturated acids. Active sites could also be formed by treatment of the pigment with carbon monoxide plus chlorine or phosgene.

28. Vapor phase TiO_2 pigments containing controlled amount of silica could be produced by the burning of mixtures of $TiCl_4$ and $SiCl_4$.

29. Epichlorohydrin derivatives of clays would be a source of an inorganic epoxy type compound which upon amine curing would form a new type of clay-epoxy resin. The clay through its reactive OH groups might thus serve as an inexpensive inorganic replacement for bisphenol-A which is normally used. Similar derivatives may be made using lead and titanium compounds as well as silica gel in place of bisphenol-A. Bisphenol may likewise react through the two phenolic hydroxyl groups of salicylic acid. This proposal will be treated in more detail separately.

30. Polymeric lead stabilizers. Basic lead acrylate should be polymerizable through the acrylic acid groups to form a polymeric lead basic compound with stabilizing properties. Modifications can be introduced through copolymerization of the acrylate with other monomers such as vinyl acetate. A possible advantage of such a material might be in the preparation of nonfuming lead stabilizers since large light diffusing lead chloride crystals might not form as readily when such polymers undergo reaction with HCl.

31. The development of a water based coating where the vehicle is largely inorganic in nature. Considerable economic advantage would be achieved if a silicate or aluminum based coating could be prepared with the properties now being obtained with organic latex vehicles.

32. Development of an electroconducting binder to accompany a new grade of titanium pigment which is now being studied by the Titanium Division for use in electrostatic printing papers. The tailoring of a binder to accompany such a pigment could at the same time provide a new product and also be beneficial to the sales development of titanium dioxide as a replacement for the presently used zinc oxide.

33. Preparation of fibers of barium titanate, titanium dioxide and potassium titanate via the NC viscose rayon technique. Such fibers could be usable in dielectric applications and as a reinforcement agent.

34. Spinning of a double glass strand to produce a crimped glass textile fiber. One of the deficiencies of glass fibers in comparison with natural fibers and some synthetics is the lack of a curl or crimp which would enhance the flexibility, hand and drape of a woven fabric. The properties of natural fibers such as wool and cotton are due in part to this factor. Crimping or coiling the fiber is obtained as a result of the helical coiling of two slightly different types of polymeric chains which exhibit different thermal expansions and crystal structures. This occurs naturally and may be obtained synthetically by spinning two slightly different compositions through the same spinnerette.

35. Low cost hydroxyl polymers for polyurethanes. Hydroxyl containing prepolymers presently used for polyurethanes are presently based upon polyesters and are in an intermediate price range. Hydroxyl containing vinyl monomers are proposed as a means of obtaining lower cost materials. Formaldehyde may be used to introduce the hydroxyl groups.

36. Self contained battery plate. Investigation of a battery plate in which conductivity is produced through the use of conducting particles mixed with the oxide as a means of producing a positive plate of low weight. A plastic grid made conducting through the incorporation of graphite could be used. Advantages would be lower weight and resistance to battery plate corrosion.

37. Vapor phase treatment of a pigment with monomer in a low discharge process to deposit controlled thin coats of selected polymers. Control over agglomeration, dispersion and improvement in film properties might be obtained. Refer to "Chemical Week", July 18, 1964, regarding a glow discharge process for use in can coating by Continental Can Company. Process was licensed from Radiation Research Corporation of Westbury, L. I., N. Y. The technique involves a treatment in a monomer atmosphere under the influence of a field of 300-1000 volts.

38. Manufacture of ABS for use in injection molding of structural plastics. A study of the advisability for the company to enter the field of structural plastics to take advantage of the increasing trend in the replacement of die cast metals by plastics.

39. Fiber foil cans. Investigation of the continuous lamination of Mylom films to metal foil for the manufacture of spiral wound containers. The application of a thin metal foil would lend strength while Mylom would contribute heat sealability and corrosion resistance.

40. Polymeric lead and tin stabilizers. The polymerization of lead or tin maleates or fumarates would provide a means for obtaining polymeric stabilizers. The properties would be difficult to anticipate but improvements might be expected in compatability, avoidance of blooming and possibly increased clarity. See Tsiurikhaeva, Tr. Kazan. Khim. Technology Inst. No. 34, 321-5 (1965) Russ.

41. Improvement of coalescence in latex polymers. A latex polymer would be prepared in which additional acrylic acid or acrylamide would be added towards the end of the polymerization to yield an outer shell which is more easily swollen in water. Improved coalescence might then be obtained. The latex should be used in the form of either the sodium or the morpholine salt in order to increase the water sensitivity of the outer shell. Morpholine would be preferred since it would disappear on drying and the polymer would revert to a water resistant product. See Literature Memorandum 2653 - J. Applied Polym. Sci. 11 (10), 1963-78 (1967) England.

42. Grafts of acrylamide to polyvinyl alcohol for use as a gellant.

60. Silica for use as a fine particle size plastics filler.

61. The coating of titanium dioxide with SiO_2 as produced by the poly-silicic acid sol. Pigment wetting could be promoted.

62. Silicic acid as a base for grafting or as a reactive filler in producing isocyanates or epoxy resins.

63. Lithium montmorillonite for use as a slowly leachable tranquilizer. Lithium carbonate has been shown to be an effective tranquilizer functioning without side effects and the suggested complex may provide a means of obtaining prolonged action since lithium is complexed in the clay lattice.

Proposals Contained in Mr. [illegible]'s Letter of [illegible]

64. Wetting and dispersion.

65. Improvement of the dry hiding of latex paints.

66. Fine particle size extenders for use with titanium dioxide.

67. Clear finishes for exterior wood.

68. Dispersing agents for latex paints, e.g. gallants.

69. Low cost ethylene-vinyl acetate latices.

70. U. V. absorbers.

71. New techniques for the application and conversion (drying of paints.

RFE:abt

R. F. Eastman

cc - Mr. W. A. Singer
Mr. J. A. Costello

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