

Titanate coupling agents act as molecular bridges at the interface of an inorganic filler and an organic polymer matrix. Their reaction with the free protons at the inorganic interface results in the formation of organic monomolecular layers on the inorganic surface providing, among other significant effects: viscosity reduction; hydrophobicity; adhesion promotion; corrosion protection; controlled catalysis; increased electrical conductivity; increased elongation and impact. Chemical mechanisms, illustrative effects, data and patent literature references explain as well as substantiate the claims.

Abstract No. 140

Improved Metal-Polymer Wet Strength Adhesion

Graham* and **J. A. Emerson**, Western Electric Co., Engineering Research Center, Princeton, NJ 08540

Improved wet strength adhesion of epoxy coated steel substrates is accomplished by wetting tin hydrosol and organic coupling agent treatment of the clean steel. The adhesion is measured by a 90° peel test. The adverse effect of water on adhesion for a series of metal treatments were examined. For the steel/epoxy substrate, it was found that: (i) clean only samples showed approximately 80-100% reduction in adhesion, (ii) iron or zinc phosphate samples varied from 60-90% reduction, and (iii) organic modified wetting tin hydrosol showed 0-50%.

Abstract No. 141

Adhesion of Aromatic Polyimide to Silicon Wafer

I. K. Lee and **J. D. Craig**, E. I. du Pont de Nemours & Co., Philadelphia, PA 19146

The adhesion of polyimide on a silicon wafer is poor if no adhesion promoter is used. Organic silane compounds are often used as the adhesion promoter. In this paper we propose the mechanism of silane to promote adhesion and experimental evidence to support the hypothesis. The intercoat adhesion of polyimide is important when the PI is used as a dielectric for multilevel metallization. Attempts are made to study this property for different polyimide coatings.

Abstract No. 142

Effect of Residual Chemical Contaminants on Polyimide/Surface Interface Adhesion

M. Chaker and **R. J. Clark***, IBM Corp., Essex Junction, VT 05452

The presence of a chemical contaminant on a substrate (ceramic, silicon, or metallic surface) will effect the adhesion of a polyimide film to that surface. Quantitative measurements for the level of contamination were performed, using chemical extraction techniques of the suspect samples, which in turn were followed by the separation of the solution in a high pressure liquid chromatograph. Subsequently, contact angle measurements of the polymeric solutions on different substrates were used as an indicator and monitor for the cleanliness of those surfaces. The addition of a silane coupling agent to the polymeric solution before application reduces the effect of the contaminant and the sensitivity to the process environment.

Abstract No. 143

The Study of Some β -Diketones as Complexing Agents for the Adhesion Promotion Between Carbon Steel and Polymeric Coating

T. T. Kam* (Present address: Abteilung Korrosion, Technische Universität Clausthal, D-3392 Clausthal-Z., Germany), and **P. K. Hon**, Dept. of Chemistry, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong

The polymeric coating of carbon steel with methyl/n-butyl methacrylate copolymer resin for corrosion protection can be strengthened by some Fe(III) β -diketonate complexes firstly developed on the metallic (iron) surface by reaction with the corresponding β -diketone complexing agent. Increase in corrosion protection has been demonstrated and related to the kind of complexes developed. Reinforcement of adhesion in the polymeric coating probably resulted from chemical interactions between the polymeric components and the functional groups of the complex.

ELECTRONICS—LUMINESCENCE**Display Technology and Special Purpose Cathode-Ray Tubes**

Abstract No. 144

Phosphors for Special Cathode Ray Tubes

P. Seats, Thomas Electronics, Inc., Wayne, NJ 07470

Some 50 or more phosphors are in use either singly or in combination for special cathode ray tube screens. The origins of some of the more important phosphors are reviewed. Many of these were developed with stimulation from the commercially important fields of television tubes, fluorescent lamps, and x-ray intensifier screens. Despite the wide range of available characteristics encompassed in many phosphor types, however, important gaps exist, some of which are identified and discussed.

Abstract No. 145

Panel Displays Based on Electron-Beam Technology

B. Kazan, Xerox Research Center, Palo Alto, CA 94304

During the past decade it had been hoped that progress in the newer display technologies would lead to large-screen panels for TV applications. However because of increasing doubts that any of these technologies will result in devices capable of achieving the performance levels necessary to compete with cathode-ray tubes, the applicability of electron-beam technology itself is being investigated for panel displays. Towards this end, work is presently under way on several promising new vacuum structures.

Abstract No. 146

Advances and Applications of Storage Cathode Ray Tubes

I. F. Chang, IBM T. J. Watson Research Center, Yorktown Heights, NY 10598

Storage CRT's have wide applications as oscilloscopes, signal converters, and imaging and display devices. Different storage CRT technologies are in use for these applications. Facing strong competition, some significant technological advances have been made in storage CRT's for information display applications where CRT's with special phosphor screens such as long persistence phosphors, secondary electron emitting phosphors (bistable phosphor screen), cathodochromic phosphors (dark trace faceplate), and electroluminescent phosphors (memory EL faceplate) were utilized. These storage CRT's are reviewed.

Abstract No. 147

Color Write-Thru Direct View Storage Tubes

R. O. Petersen, Tektronix, Inc., Beaverton, OR 97077

Color in computer graphics aids the user in discernment of data. Color write-thru in direct view storage tubes (DVST's) is discussed. Write-thru in a DVST is the refresh luminance that occurs when the writing beam is sweeping at sufficient vector speed and low I_b as not to store. Use of special coatings on P-1 and P-22R phosphors provides green storage and orange write-thru. These two phosphors are discussed along with DVST performance.

Abstract No. 148

A New Cathodoluminophor with Long Persistence

J. J. Wei, **Z. H. Wang**, **S. Y. Zhao**, **Y. Wu**, **S. H. Lu**, and **S. H. Xu***, Changchun Institute of Physics, Changchun 130021, Jilin, China

A new phosphor, $SrAl_2O_4$, activated with Dy^{3+} is synthesized which shows a decay time of more than 200 msec to decrease to an intensity of 1/10 of its initial value after the removal of cathode ray excitation. The luminescence spectrum is characteristic of Dy^{3+} , appearing yellow-white in color. The cathodoluminescence brightness is comparable to commercial $MgF_2:Mn$, or about 60% that of $Zn_2SiO_4:Mn,As(P39)$. The luminescence decay is nonexponential. Thermoluminescence after CR excitation shows the existence of deep traps which are responsible for the slow decay.