

Meeting Abstracts

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Evaluation of Barrier Properties of Organic Coatings By Electrochemical Permeation and Electrochemical Methods

Jessica Venger Nardelli¹, Cecilio Sádico Fugihara¹ and Aécio Vicente Benedetti²[Author Affiliations](#)**Abstract**

This study aims at investigating the transport through free-films of organic coatings derived from vegetable oils (canola oil and cedar oil) plus pre-polymer based on hexamethylene diisocyanate and castor oil, which were used in our previous studies to protect aluminum alloy (AA1200) against corrosion in NaCl solution [1]. The free-films were characterized by Raman, NMR, FTIR and AFM (roughness and texture), and the permeability to KCl in aqueous solutions was investigated by electrochemical impedance spectroscopy (EIS) and open circuit potential (E_{OCP}) measurements as function of time. Different coating formulations were tested to demonstrate the influence of their structure and chemical composition on electrolyte permeability. The good corrosion resistance of these coatings encouraged us to investigate the KCl permeability to assist in understanding the mechanism of corrosion protection of the aluminum alloy surface. The measurements were done by using a setup similar to that employed by Armstrong et al. [2] in 0.1 mol L⁻¹ KCl aqueous solution, at 25 °C and atmospheric pressure. Raman, NMR, and FTIR spectra, and AFM images were taken before and after four months of immersion in the electrolyte and no significant differences between spectra or images were found. These results allowed concluding that no compositional and/or chemical structural and topological changes have occurred in the free-films. EIS and EOCR measurements were conducted with the free-films of organic coatings immersed in 0.1 mol L⁻¹ KCl aqueous solutions for four months at 25 °C and atmospheric pressure. The modulus of impedance remained between 1.2 to 1.7 GΩ cm² suggesting that the coating is not degraded by the solution and K⁺ and Cl⁻ ions permeability is practically insignificant.

References

[1] J.V. Nardelli, D.V. Sádico, C.S. Fugihara, M.F. Montemor, E.R.P. Pinto, Y. Messaddeq, A.V. Benedetti, Localised corrosion assessment of canola-oil-based polyurethane coatings applied on the ASTM 1200 aluminum alloy, *Corros. Sci.* 111 (2016) 422-435.

Acknowledgments

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Organic Coatings Properties And Evaluation

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Organic Coatings Properties And Evaluation:

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Organic Coatings, Applications, Properties, and Performance Zeno W. Wicks, Frank N. Jones, S. Peter Pappas,1994 This companion work to Volume 1 Film Formation Components and Appearance Wiley 1992 reviewed in the February 1993 SciTech Book News focuses primarily on the application characteristics and formulation of coatings Chapters 19 27 cover basic principles involved in the application and performance of coatings Chapters 28 32 deal with solvent borne water borne electrodeposition powder and radiation cure coatings Chapters 33 36 deal with various end uses for coatings Finally chapter 37 deals with the topic of productivity and creativity i e how a formulator can work more effectively and efficiently Annotation copyright by Book News Inc Portland OR

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Preliminary Assessment of the Mechanical Properties of Organic Coatings Amer Hamade,1996 **Mechanical Properties, Performance, and Failure Modes of Coatings** Mechanical Failures Prevention Group. Meeting,1984-08-31 The use of coatings in industry is growing and will continue to grow because of the economic and technical advantages they offer over uncoated materials Although a wide variety of materials and application of techniques are available much less is known about the properties of specific coatings and their measurement This 1984 volume contains some 26 papers that were presented at a 1983 symposium organized to explore these questions The symposium was divided into five sessions dealing

with coating technologies measurement of coating properties marine coatings field applied coatings for corrosion control and tribological coatings **Annual Book of ASTM Standards** American Society for Testing and Materials,2003 A compilation of all ASTM standards issued each year Guidebook and Directory for the Metal Finishing Industries ,1990 **Organic Coatings** ,1983 Journal of Research of the National Bureau of Standards ,1967 Annual Book of ASTM Standards

ASTM International,American Society for Testing and Materials,2003 Organic Coatings Zeno W. Wicks,2007-01-29 Third Edition brings acclaimed text thoroughly up to date with the latest organic coatings technology Organic Coatings Third Edition is an unparalleled reference and text for organic coatings technology and its myriad applications It begins with discussions of key principles of coatings then thoroughly explores raw materials physical concepts formulations and applications Scientists engineers and paint formulators all gain a deeper understanding of the principles underlying the technology and learn how to use these principles in the development production and application of organic coatings The four authors all leading industry experts offer a unique approach to the topic that correlates the empirical technology of coatings with the underlying science This Third Edition has been completely revised and updated to reflect numerous changes in the field including changes driven by increasing pressure to lower VOC emissions reduce energy requirements and eliminate potential health hazards from organic coatings components In addition the authors have developed new material to make the text more accessible for scientists and engineers first entering the field as well as for students taking coatings courses At the same time the hallmarks that distinguished the two previous editions have been retained including Troubleshooting guidance for coatings scientists and technologists Clear differentiation between established principles and hypotheses requiring further research Precise definitions of coatings industry terminology Extensive references to the current literature Hundreds of figures that help readers visualize key concepts and techniques Whether you are just entering the field of organic coatings and need a broad overview or you are an experienced professional who needs a sophisticated reference you can depend on Organic Coatings to give you the information and answers you need **Special Publication** ,1980 **Paint and Varnish Production** ,1956

Journal of Research United States. National Bureau of Standards,1968 Technical Information Pilot ,1949

Symposium on Properties, Tests, and Performance of Electrodeposited Metallic Coatings American Society for Testing Materials,1956 **Organic Coatings, Science and Technology** G. D. Parfitt,Angelos V. Patsis,1983 **Nuclear Science Abstracts** ,1966

The Top Books of the Year Organic Coatings Properties And Evaluation The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous engrossing novels entralling the hearts of readers worldwide. Lets delve into the realm of popular books, exploring the captivating narratives that have enthralled audiences this year. Organic Coatings Properties And Evaluation : Colleen Hoovers "It Ends with Us" This touching tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover expertly weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can triumph. Organic Coatings Properties And Evaluation : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This captivating historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids captivating storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Organic Coatings Properties And Evaluation : Delia Owens "Where the Crawdads Sing" This captivating coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens weaves a tale of resilience, survival, and the transformative power of nature, captivating readers with its evocative prose and mesmerizing setting. These top-selling novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of compelling stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a masterful and gripping novel that will keep you guessing until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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