

Electronic Thin Film Reliability

Electronic Thin-Film Reliability Thin Film Materials, Processes, and Reliability Thin-film Reliability Trends Toward Improved Stability The Mechanics and Reliability of Films, Multilayers and Coatings Descendencia de la casa y mayorazgo de los Céspedes, de Ciudad Real Materials Science of Thin Films Thin-Film Reliability Trends Toward Improved Stability: Preprint Thin-Film Transistor Reliability Environmental Reliability of Thin Film Sealing on Thick Film LTCC Scientific and Technical Aerospace Reports Packaging, Reliability and Manufacturing Issues Associated with Electronic and Photonic Products Thin Film Materials, Processes, and Reliability Solar Energy Update Adhesion and Thin-film Module Reliability Energy Research Abstracts Reliability Study of Poly-Si Thin-film Transistors Reliability Abstracts and Technical Reviews Study on the Reliability of Gap-Type Thin Film Transistors Under Low Illumination Adhesion and Thin-film Module Reliability Proceedings of the International Symposium on Thin Film Materials, Processes, Reliability, and Applications, Thin Film Processes King-Ning Tu G. S. Mathad Dirk C. Jordan Matthew R. Begley Milton Ohring Meng Zhang, Mingxiang Wang Charles Robert Bourland Charles Ume Electrochemical Society. Meeting T. J. McMahon [2002] (2002) G. S. Mathad

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thin films are widely used in the electronic device industry as the trend for miniaturization of electronic devices moves into the nanoscale domain the reliability of thin films becomes an

increasing concern building on the author's previous book electronic thin film science by tu mayer and feldman and based on a graduate course at ucla given by the author this new book focuses on reliability science and the processing of thin films early chapters address fundamental topics in thin film processes and reliability including deposition surface energy and atomic diffusion before moving onto systematically explain irreversible processes in interconnect and packaging technologies describing electromigration thermomigration and stress migration with a closing chapter dedicated to failure analysis the reader will come away with a complete theoretical and practical understanding of electronic thin film reliability kept mathematically simple with real world examples this book is ideal for graduate students researchers and practitioners

the symposium covered three topics i plasma processing for

long term stable performance of photovoltaic pv modules will be increasingly important to their successful penetration of the power grid this paper summarizes more than 150 thin film and more than 1700 silicon pv degradation rates rd quoted in publications for locations worldwide partitioning the literature results by technology and date of installation statistical analysis shows an improvement in degradation rate especially for thin film technologies in the last decade a cigs array deployed at nrel for more than 5 years that appears to be stable supports the literature trends indoor and outdoor data indicate undetectable change in performance 0 2 0 2 yr one module shows signs of slight degradation from what appears to be an initial manufacturing defect however it has not affected the overall system performance

a wide variety of applications ranging from microelectronics to turbines for propulsion and power generation rely on films coatings and multilayers to improve performance as such the ability to predict coating failure such as delamination debonding mud cracking blistering crack kinking and the like is critical to component design and development this work compiles and organizes decades of research that established the theoretical foundation for predicting such failure mechanisms and clearly outlines the methodology needed to predict performance detailed coverage of cracking in multilayers is provided with an emphasis on the role of differences in thermoelastic properties between the layers the comprehensive theoretical foundation of the book is complemented by easy to use analysis codes designed to empower novices with the tools needed to simulate cracking these codes enable not only precise quantitative reproduction of results presented graphically in the literature but also the generation of new results for more complex multilayered systems

this is the first book that can be considered a textbook on thin film science complete with exercises at the end of each chapter ohring has contributed many highly regarded reference books to the ap list including reliability and failure of electronic materials and the engineering science of thin films the knowledge base is intended for science and engineering students in

advanced undergraduate or first year graduate level courses on thin films and scientists and engineers who are entering or require an overview of the field since 1992 when the book was first published the field of thin films has expanded tremendously especially with regard to technological applications the second edition will bring the book up to date with regard to these advances most chapters have been greatly updated and several new chapters have been added

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thin film transistor reliability provides a comprehensive analysis of the reliability challenges in thin film transistors tfts essential components in modern electronics covering topics from fundamental structures to degradation mechanisms this book equips researchers and engineers with the tools to assess analyze and improve tft reliability the book systematically explores key reliability concerns including performance characterization defect states voltage stress effects circuit level degradation and environmental influences advanced reliability analysis methods and practical improvement strategies are also discussed offering insights into future developments key features in depth discussion of tft degradation mechanisms and reliability concerns comprehensive analysis techniques including transfer curve and noise analysis effects of dc ac voltage stress self heating and environmental factors strategies for enhancing tft reliability through structural modifications

as electronic components and systems become more intricate and expand into new realms of use case scenarios new materials systems must be explored with new systems comes the balancing acts of cost and reliability presented here is a thesis that explores a new hybrid electronics packaging system using low temperature co fired ceramics referred to as ltcc an ltcc system was designed to explore the environmental reliability of numerous thick film ltcc features and parameters a key element was to explore how a thin film metallization stack up used to cap or seal underlying thick film structures would decrease environmental susceptibility while at the same time optimizing costs a material matrix of 16 recipes was developed with 14 primary feature types to be evaluated it was decided that the ltcc systems undergo five environmental reliability tests which were as follows lifetime at elevated temperature thermal cycling humidity thermal shock and corrosion via salt fog spray all environmental reliability tests were performed in accordance to either mil or jedec

standards or specifications an investigation of occurring phenomena through each environmental test is presented

we present peel strength data for test specimens laminated from the three thin film technologies before and after damp heat and in one instance at elevated temperatures we measure a wide range of adhesion strengths and suggest that adhesion measured under higher temperature and relative humidity conditions is more relevant for module reliability

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