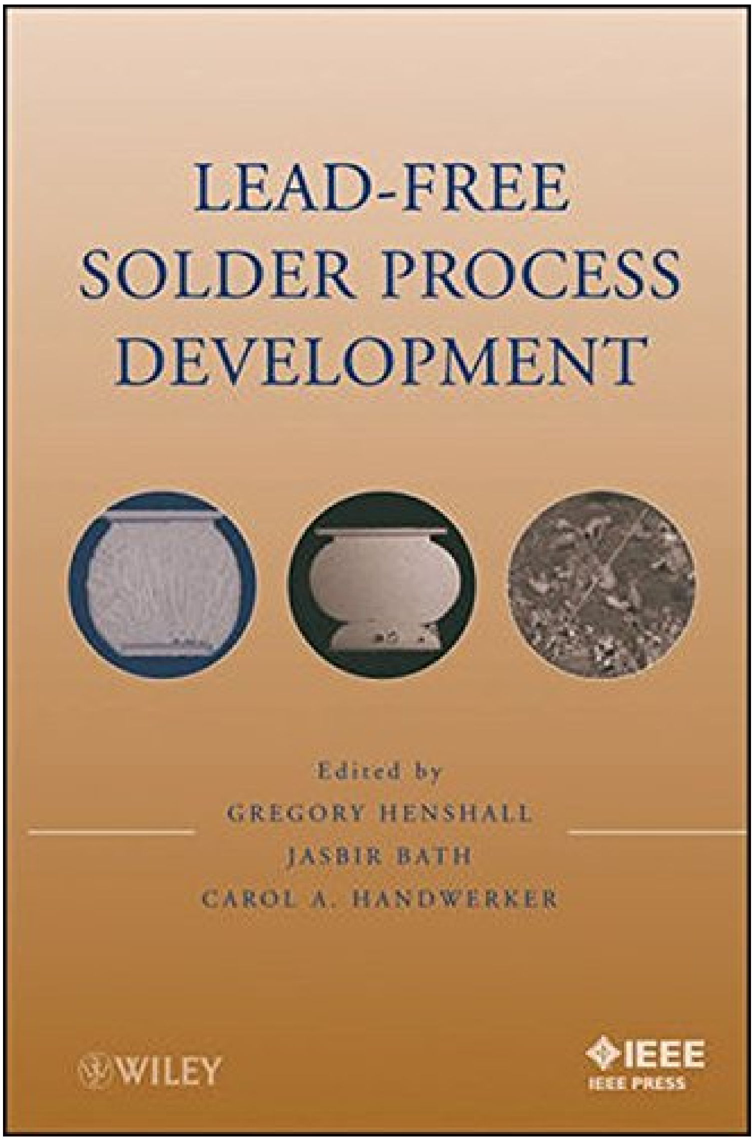
Lead-Free Solder Process Development

From Wiley-IEEE Press



#5216052 in Books 2011-03-29Original language:EnglishPDF # 1 9.50 x .85 x 6.30l, 1.25 #File Name: 0470410744284 pages | File size: 63.Mb

From Wiley-IEEE Press : Lead-Free Solder Process Development before purchasing it in order to gage whether or not it would be worth my time, and all praised Lead-Free Solder Process Development:

Discusses the growth mechanisms of tin whiskers and the effective mitigation strategies necessary to reduce whisker growth risks This book covers key tin whisker topics, ranging from fundamental science to practical mitigation strategies. The text begins with a review of the characteristic properties of local microstructures around whisker and hillock grains to identify why these particular grains and locations become predisposed to forming whiskers and hillocks. The book discusses the basic properties of tin-based alloy finishes and the effects of various alloying elements on whisker formation, with a focus on potential mechanisms for whisker suppression or enhancement for each element. Tin whisker risk mitigation strategies for each tier of the supply chain for high reliability electronic systems are also described. Discusses whisker formation factors including surface grain geometry, crystallographic orientation-dependent surface grain boundary structure, and the localization of elastic strain/strain energy density distribution Examines how whiskers and hillocks evolve in time through real-time studies of whisker growth with the scanning electron microscope/focused ion beaming milling (SEM/FIB) Covers characterization methods of tin and tin-based alloy finishes such as transmission electron microscopy (TEM), scanning electron microscopy (SEM), and electron backscatter diffraction (EBSD) Reviews theories of mechanically-induced tin whiskers with case studies using pure tin and other lead-free finishes shown to evaluate the pressure-induced tin whiskers Mitigating Tin Whisker Risks: Theory and Practice is intended for the broader electronic packaging and manufacturing community including: manufacturing engineers, packaging development engineers, as well as engineers and researchers in high reliability industries.

From the Back CoverA fully up-to-date approach to implementing lead-free soldering Environmental and health concerns have led to a growing movement to eliminate lead from electronics, specifically from electronics soldering. Lead-based solder has been used for many years with a good history of use, so the change to lead-free solder alternatives requires companies to re-examine, develop, and re-test manufacturing processes as they make the transition. Lead-Free Solder Process Development covers general lead-free soldering topics written by those specializing in these areas. Timely and up to date, this reference covers key topics including legislation, SMT, wave, rework, alloys, test, and reliability. It provides updates in areas where research is ongoing and addresses various topics that are relevant to lead-free soldering, including: Government and legislative activities Lead-free SMT assembly Lead-free wave soldering Lead-free rework Lead-free alloys for BGA/CSP components Lead-free mechanical reliability Tin whiskers Lead-free reliability in aerospace and military environments Lead-free reliability in automotive environments Testability of lead-free printed circuit assemblies Emphasizing practical knowledge of lead-free soldering rather than theory, Lead-Free Solder Process Development is written by experts who are or who have been heavily involved in lead-free implementation at the product level. Being an up-to-date book on this changing field, it is an essential read for engineers in the industry who are or will be migrating to lead-free soldering.About the AuthorGREGORY HENSHALL is Master Engineer at Hewlett-Packard Company in Palo Alto, California. He has more than twenty years' experience in materials research and development, including twelve years of experience with soldering alloys and electronics manufacturing and nine years focused on lead-free technology. Dr. Henshall currently serves as chair for the iNEMI (International Electronics Manufacturing Initiative) Lead-Free Alloy Alternatives Project. JASBIR BATH is the owner of Bath Technical Consultancy LLC in Fremont, California. He has over fifteen years' experience in research, design, development, and implementation in the areas of soldering, surface mount, and packaging technologies working for companies including Flextronics International/Solectron Corporation and ITRI (International Tin Research Institute). Bath has been chair of various iNEMI lead-free consortia involving OEMs, EMS, and component and material supplier companies on alloy selection, assembly, and rework. CAROL A. HANDWERKER is the Reinhardt Schuhmann Jr. Professor of Materials Engineering at Purdue University, Indiana. Previously, she was chief of the Metallurgy Division at the National Institute of Standards and Technology (NIST), where she participated in the NCMS (National Center for Manufacturing Sciences) Lead-Free Solder Project and co-chaired the iNEMI Lead-Free Alloy Selection Team. Dr. Handwerker is currently active on the iNEMI Technical, Research, and Environmental Leadership Steering Committees, as well as a participant in a range of iNEMI project teams.