Introduction

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Dear Reader,

With the advent of the first semiconductor transistor in 1947, the semiconductor industry was born. This technology has developed at an astounding rate that cannot be compared to the development of any other technology known to man. From that original single transistor produced by Texas Instruments in 1954, integrated circuits have sprung and currently contain over 2 billion transistors in the most complex devices. These integrated circuits are a part of nearly all of our technology today from toasters to airplanes. I doubt that there are many people alive today who have not been exposed to technology containing integrated circuits. Like everything else in the world, semiconductor devices contain defects, which can lead to failure. The success of this rapidly developing technology is based on the improvement of materials and fabrication methods, which depend critically on the ability to analyze

failures during development and throughout the lifecycle of integrated circuit products. This has led to a new field of study focused on the failure analysis of electronic devices.

In 1975, the first gathering of pioneers in this field met in California to share ideas, experiences and results in a venue that ultimately became the International Symposium for Test and Failure Analysis, ISTFA. The success of this event over the years led to the formation of the Electronic Device Failure Analysis Society, EDFAS, in 1998. The heavy materials emphasis in the failure analysis of electronic devices made for a natural association with ASM International, the Materials Information Society. Through ASM and the affiliate society, EDFAS, a newsletter, which grew into a magazine, and a desk reference are products developed to tie this community together and encourage additional sharing of information throughout the year; however, this society comprised of many disciplines including electrical engineers, physicists, materials scientists, and chemists did not have a journal through which more thorough peer reviewed results could be published.

This issue of the Journal of Materials Science: Materials in Electronics marks the first issue of peer reviewed papers for EDFAS. This has been no simple undertaking. It has taken several years to develop the awareness of this need, find the right journal to host a special issue and solicit the initial papers to get this issue launched. Many people have dedicated their time to making this possible and it is important to make special note of Jacob Phang, Aaron Falk, and Jeremy Walraven who all have played critical roles in the initial development. I would also like to thank the editorial board comprised of, Edward Cole, Christopher Henderson, David Vallett and William Vanderlinde, who helped throughout the review process. The result is a special issue focused on failure analysis, but capturing the breadth of this industry. There are papers from industry and

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academia on failure analysis covering technology areas that include integrated circuits, packages, solar cells, and discrete components. Several papers cover many different techniques leveraging photons, electrons, ions, and magnetic and acoustic imaging. The issue leads off with a paper on screening for counterfeit electronic parts, which resonates with the theme of last year's ISTFA conference and a

critical issue facing the industry today. I hope that this issue is the start of a body of knowledge that continues to grow and benefit failure analysts for many years to come. Sincerely,

Lee Knauss, Ph.D.
Guest Editor