

Dendrite Growth in Electronic Materials and Devices: A perspective and the Electrochemical Mechanism

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This paper has an objective to review the past and present contributions to the Reliability of Electronic Materials and Devices from Robert Frankenthal.

In particular the paper will deal with Dendrite Growth and will be divided in three parts. In the first part we will review the two important parts of dendritic growth: 1) The conditions for the development of Dendrites and 2) The electrochemical mechanisms that enhance dendrite growth.

In the second part we will give a brief review of the contributions from Robert P. Frankenthal in this area followed by common examples where his knowledge has been used to solve practical problems in the electronic industry.

Finally, a recent problem related to a “test supplier’s device” that developed dendritic growth during qualification will be highlighted. The initial problem, the mechanism and the results will be outlined with emphasis in the contributions from Bob Frankenthal that lead our team to solve the problem.



Fig. 1. Typical Dendrite in an Al₂O₃ substrate

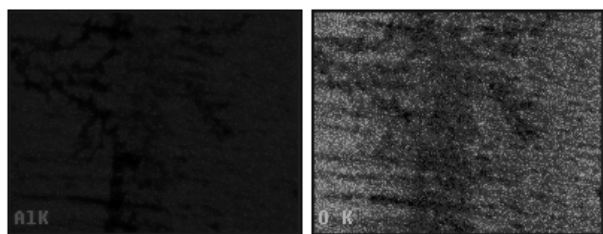


Fig. 2. Al and O maps of the dendrite shown in figure 1

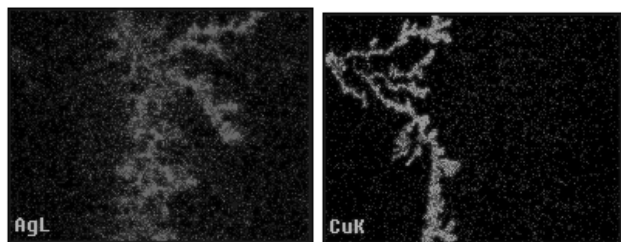


Fig. 3. Ag and Cu maps of the dendrite shown in figure 1.