

Book Review

FLAT PANEL DISPLAY MANUFACTURING

This is an extraordinary book in the SID/Wiley series. Not only does it deal with a topic that is typically not addressed, it does so in an outstandingly comprehensive way. Manufacturing methods are quite often kept as company secrets because of their perceived competitive advantage. And yet they are the key to further product improvements and continued commercial success.

The extraordinary nature of this book is quickly apparent from even a cursory examination. The book is larger than the typical SID/Wiley book -- 21 x 26 cm instead of 17 x 25 cm and has 464 pages of text rich with figures in full color including many photographs that illustrate the details of what is being described.

The editors/authors of this book are names known to almost all of us in the display industry – Jun Souk, Shinji Morozumi, Fang-Chen Luo, and Ion Bitá. There are few others who could engender more respect and have such depth of knowledge in this area. There are 40 additional contributors chosen by these editors for their specific expertise. They have shared their knowledge in authoring the 19 chapters that deal with the various topics pertinent to flat panel display manufacturing.

The book is organized in a logical flow with the first introductory chapter authored by the editors and providing a historical overview of the evolution of TFT-LCDs. Having personally experienced the entire time period covered, it was nevertheless helpful to be reminded of how LCD technology evolved and when the key developments took place. For me this was the best summary of LCD history that I have seen. Following this introductory chapter, the next set of chapter, 2 through 6, cover the topics of TFT Array Process Architecture, Color Filters, Liquid Crystal Cells, TFT-LCD Module Packaging, and LCD Backlights. Each chapter provides an abundance of useful information with extensive references at the end.

Chapters 7 through 10 are devoted to OLED manufacturing technology. The topics covered are OLED TFT Backplanes, OLED Manufacturing for Mobile Applications, OLED Processes for TV Applications, OLED Encapsulation Technology, and Flexible OLED Manufacturing. To have this extensive treatment of OLED manufacturing adds significant value to our understanding of the status and evolution of this newer display technology.

The subsequent chapters, 11 through 14, provide details on specific manufacturing processes important to both LCD and OLED production. The topics covered are Metal Lines, ITO and Thin Film PVD, PECVD deposition, Photolithography, and Wet and Dry Etching Processes,

The final set of Chapters, 15 through 19, discuss the topics of TFT Array Inspection, Testing and Repair, LCM Inspection, Productivity and Quality Control, Plant Architecture, and Green Manufacturing.

In reviewing the various chapters, I found them all to be well written and easy to read. In each case, I was impressed with the supporting figures that provide a visual explanation of what is being described in the text. For reasons of space, some of the figures are so full of information that they could have been made larger, but at over 450 pages I can understand why this was not done. This is a minor quibble because all the information is there and just takes a more careful look to absorb it all.

What especially impressed me is that although this book is all about LCD and OLED manufacturing, I found it to be an excellent source of information not only about the processes that are used in fabricating the displays but also the structures that result from using these processes. The explanations of the basic structures that make up TFTs, Color Filters, and the complete Display Modules were as clear and helpful as I have seen anywhere.

If there is only one book on flat panel displays that is going to be on your bookshelf, then I would highly recommend this one. It will be a text that you refer to time and again for clear and concise explanations of how LCD and OLED displays are constructed and the processes used to make them into commercially successful products. As you use it, you will find yourself drawn in by the clear and colorful illustrations and will find it hard to not read more than you first intended.

This book on Flat Panel Display Manufacturing took many hours of dedicated effort to bring it to fruition. The entire display community owes a sincere thank you to the four editors, Jun Souk, Shinji Morozumi, Fang-Chen Luo, and Ion Bitu, and to the 40 additional contributors for their many hours of dedicated effort.