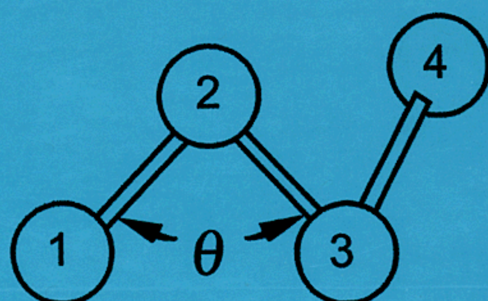
Handbook of Imaging Materials

Second Edition, Revised and Expanded



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Preface to the Second Edition

Since its publication in 1991, the *Handbook of Imaging Materials* has taken its place on the reference shelf of many leading scientists, engineers, and executives in the imaging industry. It is also well known in the academic world as both a sourcebook and textbook. There is no comparable reference available that is as highly focused or as comprehensive in defining the field of digital imaging technology.

To compile this second edition, we have worked with the authors to expand and update their original chapters while bringing in new contributors to cover the many advances that have occurred over the past decade. This second edition was enlarged and enriched by new ink jet, thermal, and electrophotographic technologies. These technologies, the digital color press, and new thermal dye diffusion methods all promise to challenge silver halide photography in amateur, commercial, and professional applications.

Although the use of diazotype materials is also fading into obsolescence, this process retains a foothold in the marketplace, primarily for wide format engineering and architectural blueprints and drawings. For these reasons and for the excellence of its content, Chapter 3 on diazo papers, films, and chemicals was again included in this volume.

Among the new chapters are: color photographic materials (Chapter 2), electrophotography (Chapter 4), photothermographic and thermographic imaging materials (Chapter 13), and papers and films for ink jet printing (Chapter 15).

In order to incorporate these topics effectively, the chapter on cylithography was excised. Despite major technical advances that have been made in cylith technology since 1991, that process has not had a significant impact in the imaging materials marketplace.

Finally, we are deeply indebted to those who contributed their knowledge, their writing skills, and their patience to this revised edition. We are grateful for their efforts in enabling us to expand the scope of this text and to bring it up-to-date in a field of science that is so rapidly advancing.

Arthur S. Diamond
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Photoreceptors: The Chalcogenides

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9.1 INTRODUCTION

The commercial importance of amorphous selenium (a-Se) and its various alloys at present lies in their use as xerographic photoreceptor materials (e.g., Se–Te alloys and As_2Se_3) and more recently as x-ray photoconductors in x-ray imaging though, in the past, crystalline selenium has had successful applications in photocells, solar cells, and rectifier diodes. In a much smaller quantity, amorphous Se–Te–As alloys are also used in Hitachi's Saticon TV pickup tubes (Goto et al., 1974; Maruyama, 1982). The xerographic photoreceptors over the last decade have been progressively using more organic photoconductors rather than selenium alloys, and this trend is expected to continue (Schein, 1988; Springett, 1989, 1994). Some large-volume copying applications still use a-Se alloys since they provide many copies per drum. Another challenge to the chalcogenide photoreceptor comes from a-Si:H photoreceptors, which have good sensitivity in the red and IR regions and exceptionally long machine lifetimes, as is discussed by Mort (Chapter 16) and Joslyn (Chapter 11) in this handbook. Recent research on x-ray imaging systems utilizing the x-ray sensitivity of a-Se photoconductors, however, suggests that the x-ray photoconductor usage is likely to experience substantial growth, as will be discussed later in this chapter. There are currently a number of potential applications for selenium-based amorphous semiconductors in high-sensitivity TV pickup tubes, called the HARPICON (Tanioka et al., 1988), in large area x-ray sensitive vidicons for medical imaging, called the X-icon (Luhta and Rowlands, 1991), in ELIC (electrophotographic light-to-image converter) imaging devices (Kempter et al., 1983), in optical storage (Koshino et al., 1985; Matsushita et al., 1987), in IR fiber optics (Klocek et al., 1987) and in optical recording of images via selective