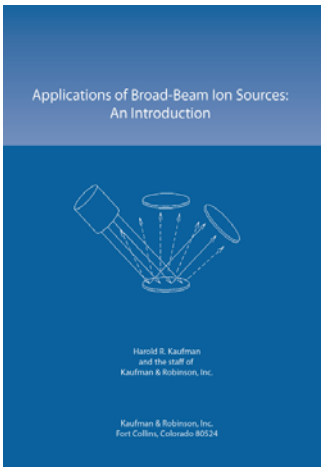
Kaufman & Robinson
The Ion Source Authority℠

Kaufman & Robinson announces their newly released book for applications in ion source processes. Harold R. Kaufman provides a fundamental tool to guide users in the use of broad-beam sources.

"Applications of Broad-Beam Ion Sources"

Understand and improve your process applications, includes:

- Guidance in ion beam deposition and etching
- Selecting the appropriate source configuration
- Optimizing process rates, uniformity, and yields understanding material and ion interactions
- Useful tables and figures, including extensive data on etch rates



Look Inside!

Summary:

The topics covered in this book should provide the reader with the fundamentals to understand and improve process applications using broad-beam ion sources. This book covers three broad categories of topics:

The first category is the generation and propagation of broad ion beams. The generation includes descriptions of the common types of ion sources used, their operation, and their relative advantages and limitations. The propagation includes the internal ion-beam properties such as collimation, divergence, and neutralization, as well as the external properties such as process rate, uniformity, coverage, and the effects of source-target distance.

The second category is the materials science of broad-beam processes. This includes the charge exchange and momentum loss of the ion beam as it passes from the ion source to the target, as well as the momentum loss of sputtered particles. It also includes the ion-target processes such as etching, ion penetration, ion damage, film densification and property modification, distribution of sputtered particles, and substrate heating. The basic features, problems, and limitations of patterned etching are also discussed, as well as the sputter deposition of films.

The third category is the comprehensive and detailed information on different elements and compounds that is included in the figures and tables. This information includes the effects of target temperature on the formation of textures and the depth of damage. It also includes estimates of ion-assist doses. Perhaps the most important is the use of recent empirical and semi-empirical studies to generate tables of physical-sputtering etch rates, over a broad range of energies, for many elements and compounds for which experimental data are limited or nonexistent. Some figures and tables are included for processes that have large inherent errors and/or lack a detailed theoretical understanding. Descriptions of the shortcomings of such information are included. But it is also recognized that, for someone who has a job to do, a rough estimate can be a better starting point than no estimate at all.

Many references are given, together with their titles. Not only is the title a small abstract but, if you want a copy of the original reference, the exact title is often the quickest way to find the publication on the internet.

Table of Contents Chapters:

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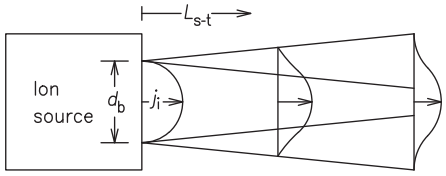


Fig. 2-5. Typical ion-source profile with collimated optics.

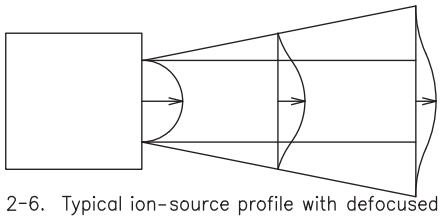


Fig. 2-6. Typical ion-source profile with defocused optics.

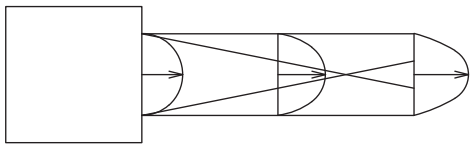


Fig. 2-7. Typical ion-source profile with focused optics.

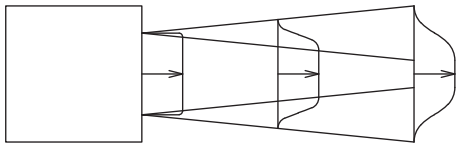
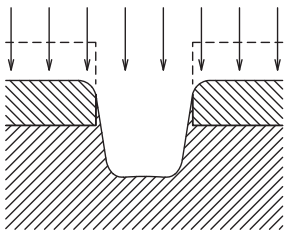
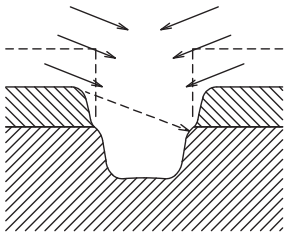


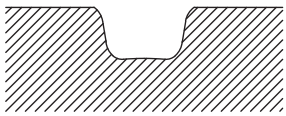
Fig. 2-8. Uniform ion-source profile with collimated optics.



(a) Etched with side-wall redeposition.



(b) Second etch at large off-normal angle.



(c) Photoresist removed.

Fig. 6-17. Etched photoresist pattern, with two-step etch.

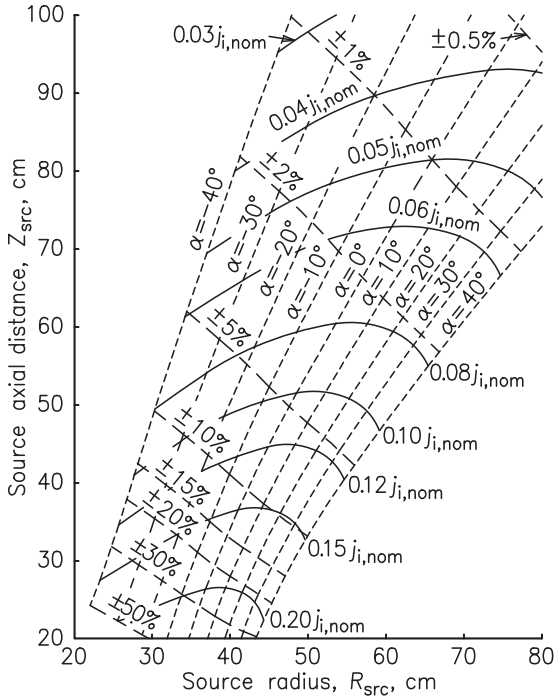


Fig. A-1. Mean ion current density and uniformity for $n = 1$ and a single-rotation flat stage with a radius of 50 cm. Source radius optimized for each combination of source axial distance and angle α. (From ref. 1, with permission.)