



AN 359

Advanced SiGe SIMS Analyses, As in SiGe

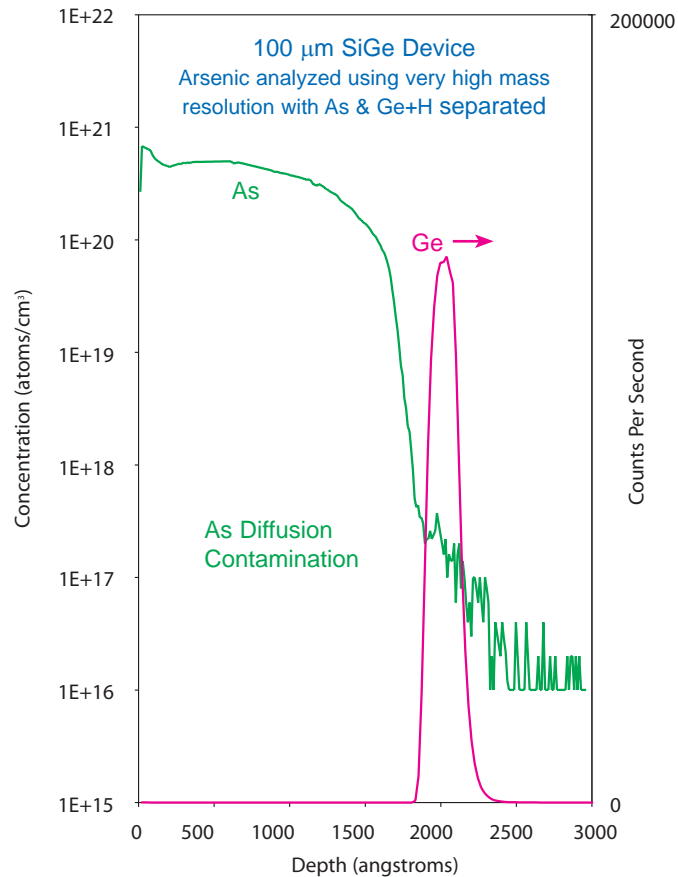
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Discussion

As SiGe devices become more common, it becomes more vital to provide supporting SIMS measurements. One critical challenge is to provide good detection of As in SiGe while still maintaining good depth resolution in a small area device. Currently these two are mutually incompatible. Small area devices ($< 100 \mu\text{m}$) create further complication. SiGe material vendors and device manufacturers would benefit from the solution to this problem.

A critical problem is ascertaining whether As contamination exists in the SiGe layer from the As doped poly-Si layer. High mass resolution (HMR) is essential to achieve low detection levels where molecular Ge+H interferes with atomic As in SiGe. A low primary beam energy is required for good depth resolution. A well-focused primary beam is required to measure a small device.

HMR as high as 11,000 was used to measure As in SiGe devices to provide detection levels in the range of $\leq 1 \times 10^{16}$ at/cm³. The analysis was performed using low energy Cs (3 keV) to maintain good depth resolution. With As separated from Ge+H, As contamination and diffusion into the SiGe layer was detected.



United States Locations

Tempe, Arizona
+1 480 239 0602 info.az@eaglabs.com
+1 602 470 2655 fax

Sunnyvale, California
810 Kifer Road
+1 408 530 3500 info.ca@eaglabs.com
+1 408 530 3501 fax

1135 E Arques Avenue
+1 408 738 3033
+1 408 738 3035 fax

785 Lucerne Drive
+1 408 737 3892
+1 408 737 3916 fax

Peabody, Massachusetts
+1 978 278 9500 info.ma@eaglabs.com
+1 978 278 9501 fax

Chanhassen, Minnesota
+1 952 828 6411 info.mn@eaglabs.com
+1 952 828 6449 fax

East Windsor, New Jersey
+1 609 371 4800 info.nj@eaglabs.com
+1 609 371 5666 fax

Syracuse, New York
+1 315 431 9900 info.ny@eaglabs.com
+1 315 431 9800 fax

Raleigh, North Carolina
+1 919 829 7041 info.nc@eaglabs.com
+1 919 829 5518 fax

Round Rock, Texas
+1 512 671 9500 info.tx@eaglabs.com
+1 512 671 9501 fax

International Locations

Shanghai, China
+ 86 21 6879 6088 info.cn@eaglabs.com
+ 86 21 6879 9086 fax

Tournefeuille, France
+ 33 5 61 73 15 29 info.fr@eaglabs.com
+ 33 5 61 73 15 67 fax

Frankfurt, Germany
+ 49 (0) 693053213 info.de@eaglabs.com
+ 49 (0) 69307941 fax

Tokyo, Japan
+ 81 3 5396 0531 info.jp@eaglabs.com
+ 81 3 5396 1930 fax

HsinChu, Taiwan
+ 886 3 5632303 info.tw@eaglabs.com
+ 886 3 5632306 fax

Uxbridge, United Kingdom
+ 44 (0) 1895 811194 info.uk@eaglabs.com
+ 44 (0) 1895 810350 fax