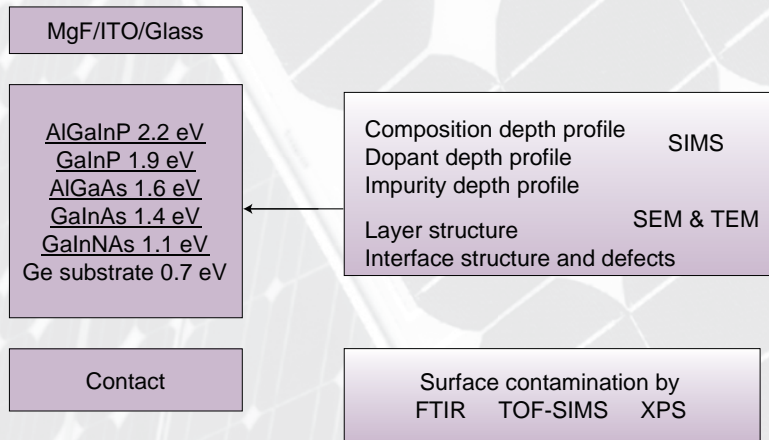




III-V Multi-Junction PV - Application Discussion

Thin Film Structure

Application & Technique



III-V solar cell technology for concentrator PV systems is a technology that originally came out of triple junction III-V solar cells used in space applications where concentrators are not used. Cells for both applications, terrestrial concentrators and space, are designed to optimize conversion efficiency by collecting a broad range of the solar spectrum. Because the III-V alloy composition determines its energy band gap and many III-V alloys can be grown epitaxially on each other, a stack of multiple layers of different bandgaps can be manufactured.

The main area for improvement of III-V thin film PV is increased conversion efficiency for concentrator PV systems, and manufacturing scale up.

Materials characterization using surface analysis methods can be used to support analysis R&D of efficiency improvements.

The schematic of the III-V thin film PV device structure illustrates some of the ways surface analysis can help.

On the left side of the schematic we see the layered structure with the 'eV' value being the energy bandgap of that layer. This pictorial is for illustrative purposes only. The actual structures have many more layers. SIMS is especially useful to characterize the impurity profiles in these III-V stacks, but can also be used to evaluate the alloy composition profile (which is more often checked with XRD). The layer structure interfaces can be characterized by FIB/SEM and TEM. The metal contact can be characterized by XPS, XRD, and RBS. In manufacturing the contamination can be evaluated by FTIR, TOF-SIMS, XPS and GCMS.

United States Locations

Arizona
3116 S. Mill Ave. #488
Tempe, AZ 85282
480 239-0602
602 470-2655 Fax
info.az@eaglabs.com

California
810 Kifer Road
Sunnyvale, CA 94086
408 530-3500
408 530-3501 Fax
info.ca@eaglabs.com

Massachusetts
10 Centennial Drive
Peabody, MA 01960
978 278-9500
978 278-9501 Fax
info.ma@eaglabs.com

Minnesota
18705 Lake Drive East
Chanhassen, MN 55317
952 641-1240
952 641-1299 Fax
info.mn@eaglabs.com

New Jersey
104 Windsor Center Dr., Ste. 101
East Windsor, NJ 08520
609 371-4800
609 371-5666 Fax
info.nj@eaglabs.com

New York
6707 Brooklawn Parkway
Syracuse, NY 13211
315 431-9900
315 431-9800 Fax
info.ny@eaglabs.com

North Carolina
616 Hutton St., Ste. 101
Raleigh, NC 27606
919 829-7041
919 829-5518 Fax
info.nc@eaglabs.com

International Locations

Evans Materials Technology (Shanghai)
Company Limited
Ste. 102, Building 44, 1387 Zhangdong Road
Pudong Area, Shanghai, China 201203
86 21 6879 6088
86 21 6879 9086 Fax
info.cn@eaglabs.com

SHIVA Technologies Europe SAS
94, chemin de la Peyrette
31170 Tournefeuille, France
33 5 61 73 15 29
33 5 61 73 15 67 Fax
info.fr@eaglabs.com

Nano Science Corporation
7F, Sumitomo Bldg., Higashi Ikebukuro 1-10-1
Toshima-Ku, Tokyo 170-0013, Japan
81 3 5396 0531
81 3 5396 1930 Fax
info.jp@eaglabs.com

Evans Analytical Group (Singapore) PTE. LTD.
Level 42, Suntec Tower Three
8 Temasek Boulevard
Singapore 038988
65 8223 8560
65 6829 2121 Fax
info.sg@eaglabs.com

Evans Taiwan LLC
5F-1, No. 31 PuDing Road
HsinChu, Taiwan, 300 R.O.C.
886 3 5632303
886 3 5632306 Fax
info.tw@eaglabs.com

Cascade Scientific Ltd.
Unit 520 Eskdale Road
Winnersh
Wokingham RG41 5TU, U.K.
44 (0) 1189 449900
44 (0) 1189 449933 Fax
info.uk@eaglabs.com

WWW.EAGLABS.COM

Visit www.eaglabs.com for more information about all of EAG's services and solutions.

EAG Corporate Offices, 810 Kifer Road, Sunnyvale, CA 94086 phone: 408 530 3500

Copyright © 2008 EAG Inc. All rights reserved. EAG, the EAG logo, are registered trademarks of EAG Inc.

Evans Analytical Group, Evans Analytical Group LLC, EAG Limited, Charles Evans & Associates, Thin Film Analysis, Inc., Applied Microanalysis Labs, Inc., AMIA Labs, Advanced Materials Engineering Research, Cascade Scientific Ltd., Cascade Scientific GmbH, Nano Science Corporation, Shiva Technologies, Inc., Shiva Technologies Europe SAS, Accurel Systems International Corporation, Micro Electronic Failure Analysis Services, Inc., DSL Labs Inc., White Mountain Labs LLC, are service marks of EAG Inc. All other company, product and service names may be trademarks of their respective companies. While every effort is made to ensure the information given is accurate, EAG does not accept liability for any errors or mistakes which may arise. All information is subject to change without notice.

