Science and Technology of Advanced Materials

Low-energy cathodoluminescence microscopy for the characterization of nanostructures

REVIEW ARTICLE

Author Benjamin Dierre[1,2], Xiaoli Yuan[1] and Takashi Sekiguchi[1,2]

Affiliations [1] Advanced Electronic Materials Center, National Institute for Materials Science (NIMS), Tsukuba 305-0044, Japan
[2] Graduate School of Pure and Applied Sciences, University of Tsukuba, Tsukuba 305-0003, Japan

E-mail sekiguchi.takashi@nims.go.jp

Journal Science and Technology of Advanced Materials Create an alert RSS this journal

Issue Volume 11, Number 4

Citation Benjamin Dierre *et al* 2010 *Sci. Technol. Adv. Mater.* **11** 043001
doi: 10.1088/1468-6996/11/4/043001

Article | References

TOPICAL REVIEW

Tag this article Full text PDF (2.76 MB)

Abstract Spatially and spectrally resolved low-energy cathodoluminescence (CL) microscopy was applied to the characterization of nanostructures. CL has the advantage of revealing not only the presence of luminescence centers but also their spatial distribution. The use of electrons as an excitation source allows a direct comparison with other electron-beam techniques. Thus, CL is a powerful method to correlate luminescence with the sample structure and to clarify the origin of the luminescence. However, caution is needed in the quantitative analysis of CL measurements. In this review, the advantages of cathodoluminescence for qualitative analysis and disadvantages for quantitative analysis are presented on the example of nanostructures.

PACS 78.60.Hk Cathodoluminescence, ionoluminescence
78.67.-n Optical properties of low-dimensional, mesoscopic, and nanoscale materials and structures
61.46.-w Structure of nanoscale materials

Subjects Condensed matter: electrical, magnetic and optical
Nanoscale science and low-D systems

Dates Issue 4 (August 2010)
Received 24 十一月 2009 , accepted for publication 4 八月 2010
Published 10 九月 2010

Your last 10 viewed

1. Low-energy cathodoluminescence microscopy for the characterization of nanostructures
Benjamin Dierre *et al* 2010 *Sci. Technol. Adv. Mater.* **11** 043001
2. Characterization of Bi and Fe co-doped PZT capacitors for FeRAM
Jeffrey S Cross *et al* 2010 *Sci. Technol. Adv. Mater.* **11** 044402
3. Synthesis and characterization of Eu^{3+},Ti^{4+}@ZnO organosols and nanocrystalline c-$ZnTiO_3$ thin films aiming at high transparency and luminescence
Tangi Aubert *et al* 2010 *Sci. Technol. Adv. Mater.* **11** 044401
4. Development of novel thermoelectric materials by reduction of lattice thermal conductivity
Chunlei Wan *et al* 2010 *Sci. Technol. Adv. Mater.* **11** 044306
5. Present status of amorphous In–Ga–Zn–O thin-film transistors
Toshio Kamiya *et al* 2010 *Sci. Technol. Adv. Mater.* **11** 044305

Users also read What's this?

1. Analysis of the electromagnetic radiation generated by a multipactor discharge occurring within a microwave passive component
2. Atmospheric microwave-induced plasmas in Ar/H_2 mixtures studied with a combination of passive and active spectroscopic methods
3. Growth temperature and V/III ratio effects on the morphology and crystal structure of InP nanowires

More

Article links

Post to CiteUlike
Post to Connotea
Post to Bibsonomy

View by subject

All Subjects
All Dates
All journals | This journal only
Search

Export

BibTeX format (bib)
Abstract | References
Export Results

6. Surface modification and characterization for dispersion stability of inorganic nanometer-scaled particles in liquid media
   Hidehiro Kamiya and Motoyuki Iijima 2010 *Sci. Technol. Adv. Mater.* **11** 044304
7. Processing of polysiloxane-derived porous ceramics: a review
   B V Manoj Kumar and Young-Wook Kim 2010 *Sci. Technol. Adv. Mater.* **11** 044303
8. Progress in engineering high strain lead-free piezoelectric ceramics
   Serhiy O Leontsev and Richard E Eitel 2010 *Sci. Technol. Adv. Mater.* **11** 044302
9. Electrode materials: a challenge for the exploitation of protonic solid oxide fuel cells
   Emiliana Fabbri *et al* 2010 *Sci. Technol. Adv. Mater.* **11** 044301