

## Fabrication and characteristics of porous germanium films

Chengbin Jing *et al* 2009 *Sci. Technol. Adv. Mater.* **10** 065001 (6pp) doi: [10.1088/1468-6996/10/6/065001](https://doi.org/10.1088/1468-6996/10/6/065001) [Help](#)

[Full text](#) [PDF \(1011 KB\)](#) | [References](#)

[Chengbin Jing](#)<sup>1,2</sup>, [Chuanjian Zhang](#)<sup>1</sup>, [Xiaodan Zang](#)<sup>1</sup>, [Wenzheng Zhou](#)<sup>2</sup>, [Wei Bai](#)<sup>2</sup>, [Tie Lin](#)<sup>2</sup> and [Junhao Chu](#)<sup>2</sup>

<sup>1</sup> College of Materials Science and Technology, Qingdao University of Science and Technology, 53 Zheng-zhou Road, Qingdao 266042, People's Republic of China

<sup>2</sup> National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, Shanghai 200083, People's Republic of China

E-mail: [jingchngbin0028@sina.com](mailto:jingchngbin0028@sina.com)

**Abstract.** Porous germanium films with good adhesion to the substrate were produced by annealing GeO<sub>2</sub> ceramic films in H<sub>2</sub> atmosphere. The reduction of GeO<sub>2</sub> started at the top of a film and resulted in a Ge layer with a highly porous surface. TEM and Raman measurements reveal small Ge crystallites at the top layer and a higher degree of crystallinity at the bottom part of the Ge film; visible photoluminescence was detected from the small crystallites. Porous Ge films exhibit high density of holes (10<sup>20</sup> cm<sup>-3</sup>) and a maximum of Hall mobility at ~225 K. Their p-type conductivity is dominated by the defect scattering mechanism.

**Keywords:** germanium, porous structured film, visible photoluminescence, semiconducting behavior

Print publication: Issue 6 (December 2009)

Received 14 August 2009, accepted for publication 19 November 2009

Published 29 December 2009

[Post to CiteUlike](#) | [Post to Connotea](#) | [Post to Bibsonomy](#)

### Find related articles

By author

[jn IOP](#)

[jn CrossRef Search](#)

### Article options

[E-mail this abstract](#)

[Download citation](#)

[Add to Filing Cabinet](#)

[Create e-mail alerts](#)

[Recommend this journal](#)

### Authors & Referees

[Author services](#) **NEW**

[Submit an article](#)

[Track your article](#)

[Referee services](#)

[Submit referee report](#)



### CONTENT FINDER

Science and Technology of Advanced Materials

Full Search

Help

Author:  Vol/Year:  Issue/Month:  Page/Article No:

[Journals Home](#) | [Journals List](#) | [EJs Extra](#) | [This Journal](#) | [Search](#) | [Authors](#) | [Referees](#) | [Librarians](#) | [User Options](#) | [Help](#) | [Recommend this journal](#)

Setup information is available for [Adobe Acrobat](#).

EndNote, ProCite® and Reference Manager® are registered trademarks of ISI Researchsoft.

Copyright © Institute of Physics and IOP Publishing Limited 2010.

Use of this service is subject to compliance with the [Terms and Conditions](#) of use. In particular, reselling and systematic downloading of files is prohibited.

Help: [Cookies](#) | [Data Protection](#) | [Privacy policy](#) | [Disclaimer](#)