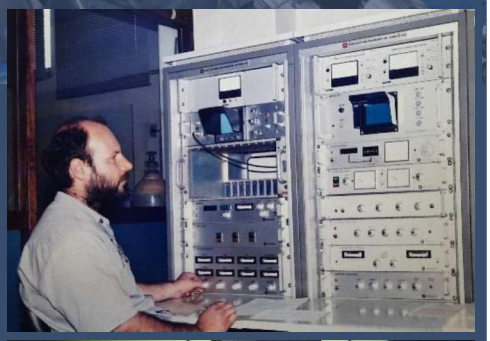
Laboratório de Implantação Iônica
Instituto de Física – UFRGS

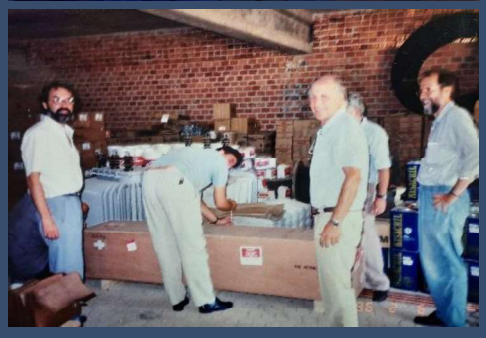
40 anos

Ion Implantation Laboratory
Institute of Physics - UFRGS








Biennial Report 2021/22

Laboratório de Implantação Iônica

Instituto de Física – UFRGS

Ion Implantation Laboratory

Institute of Physics – UFRGS

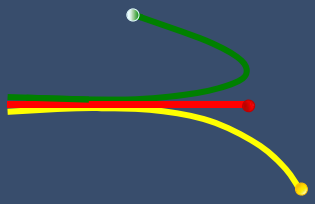
Biennial Report – 2021/22

Editors

Henrique Trombini
Silma Alberton Corrêa
Pedro Luis Grande

Porto Alegre

UFRGS IF LABORATÓRIO DE IMPLANTAÇÃO IÔNICA
2023



Laboratório de Implantação Iônica
Instituto de Física – UFRGS

Ion Implantation Laboratory
Institute of Physics - UFRGS

Biennial Report 2021/22

Editores:

Henrique Trombini - docente da Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA).

Silma Alberton Corrêa - docente da Universidade Federal do Rio Grande do Sul (UFRGS) do Instituto de Química, no Departamento de Físico-Química.

Pedro Luis Grande - docente da Universidade Federal do Rio Grande do Sul (UFRGS) do Instituto de Física, no Departamento de Física.

Dados Internacionais de Catalogação na Publicação (CIP)

Setor Técnico da Biblioteca Professora Ruth de Souza Schneider

Instituto de Física/UFRGS

B588 Biennial Report – 2021/22 [recurso eletrônico] / editado por Henrique Trombini, Silma Alberton Côrrea, Pedro Luis Grande. – Porto Alegre : Laboratório de Implantação Iônica/UFRGS, 2023.
73 p. : il.

ISBN 978-65-5973-331-6

1. Física. 2. Implantação de íons. 3. Análises por feixes de íons. I. Trombini, Henrique. II. Côrrea, Silma Alberton. III. Grande, Pedro Luis. IV. Título.

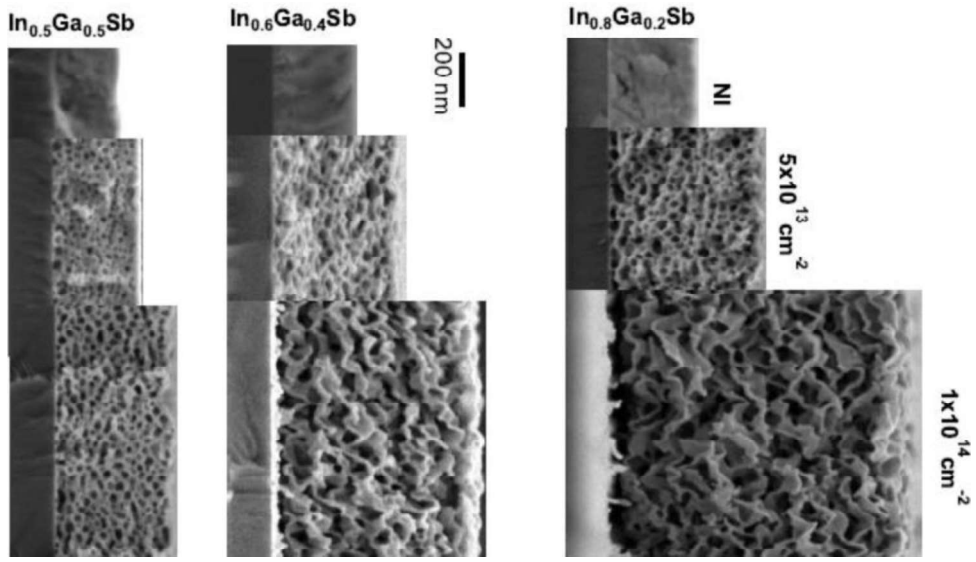
PACS 61.72

Esse livro está disponível apenas em versão digital no site do Laboratório de Implantação Iônica do Instituto de Física da UFRGS. No endereço eletrônico: http://www.if.ufrgs.br/~grande/arep2022.pdf.

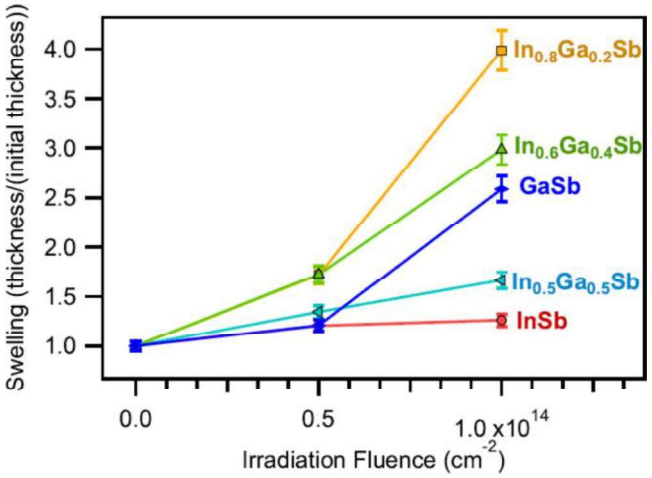
$In_{1-x}Ga_xSb$ nanofoams made by ion irradiation of sputtered films: Atomic composition and structure

Raquel Giulian

This article reports on the atomic composition and structural changes induced by ion irradiation in $In_{1-x}Ga_xSb$ films deposited by magnetron sputtering on SiO_2/Si. Samples with x values equal 0, 0.2, 0.4, 0.5 and 1 were irradiated with 16 MeV Au^{+7} ions, in the fluence range 5×10^{13} – 2×10^{14} cm^{-2} (3×10^{14} for GaSb) and the structure and atomic composition of the films were investigated. Upon irradiation, all films attain a nanofoam-like structure, and the most pronounced swelling was observed in ternary films with 20% Ga atomic concentration. With particle induced x-ray emission technique, we identified the presence of C, O, Ga, In and Sb, with C and O concentrations significantly higher in the nanofoams, compared to the as-deposited films. Rutherford backscattering spectrometry analysis showed the atomic composition of the ternaries is not uniform, but forms two layers with slightly different relative atomic concentrations, specially after irradiation, with C and O uptake greatly enhanced by ion irradiation, more pronounced towards the surface. Grazing incidence x-ray diffraction analysis revealed that ion irradiation with total fluence of 2×10^{14} cm^{-2} induces amorphization of the ternaries, except for samples with 50% Ga, which remain polycrystalline, despite the ion-induced porosity.



Scanning electron microscopy micrographs of In1-xGaxSb films, as-deposited and irradiated with 16 MeV Au+7 ions at different fluences. NI – not irradiated.



Swelling as a function of irradiation fluence for $In_{1-x}Ga_xSb$ films irradiated with 16 MeV Au^{+7} ions. Film thicknesses were measured directly from scanning electron microscopy micrographs.

Paper reference:

$In_{1-x}Ga_xSb$ nanofoams made by ion irradiation of sputtered films: Atomic composition and structure, R. Giulian, C. A. Bolzan, L. T. Rossetto, A. M. H. de Andrade and J. F. Dias, Thin Solild Films, 753 (2022) 139263.