Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Si nanostructures induced by ion-beam impact on SiO_2 CAMILLA FERREIRA DE SA CODECO, Universidade Federal do Rio de Janeiro, SERGIO L.A. MELLO, Universidade Federal de Vicosa, GERMANO M. PENELLO, Universidade do Estado do Rio de Janeiro, ANTONIO C. F. SANTOS, MARCELO M. SANT'ANNA, KRISHYNAN S. F. M. ARAUJO, Universidade Federal do Rio de Janeiro — Silicon oxide films are used in many fields due to its optical and electrical properties. One of its main applications includes the microelectronics industry, where the silicon suboxide (SiOx) can be used as a precursor for synthesis of silicon nanocrystals. Here we explore a synthesis route for these nanocrystals based on the impact of low energy ions in thin films of silicon dioxide. As the development of techniques for synthesis of nanostructures is continuous, it also becomes necessary to develop, in parallel, nanoscale characterization techniques compatible with nanometric spatial resolution. The combination of synchrotron radiation and Atomic Force Microscopy allows topographic imaging combined with nanometric infrared imaging and the measurement of IR spectra on chosen points on the images, which provide information about the vibrational modes of the solid. Our sample is a 50 nm thick silicon dioxide layer grown on top of a Si bulk. In this case we irradiate the thin film with a beam of Cs+ ions. It is possible to study the introduction of defects and disorder in the film by analyzing the changes in the normal modes of vibration of Si-O-Si in the film and to observe the nanostructure synthesis of Si nanocrystals with heights of the order of 70 nm.

Camilla Ferreira de Sa Codeco
Universidade Federal do Rio de Janeiro

Date submitted: 02 Dec 2016 Electronic form version 1.4