On the other hand, studies on the response stability of this detector in SQS regime are under way.

[02/09/03 - Poster]

Characterization of topographical effects in specters RBS

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Spectrometry RBS is one of the methods of characterization of used samples more, being possible to get information such as thickness and composition of the same ones. Recently, it comes being carried through studies that aim at its use for the study of topographical characteristics, as the roughness, as described in the book text of Chu (1978), Bill and Edge (1980), Shorin and Sosnin (1992). Metzner (1997) established that the form of specter RBS can be influenced by distribution of heights of the surface, p(h), considering incidence and backscattering with regard to normal. The objective of the present work is to expand this model for different angles out of the normal, what it will be made by means of simulations and experiments with models standard (periodic roughness) and samples with random roughness. For the simulation of p(h) was developed a code in C++ in had been gotten the distributions of corresponding heights the regular profiles of roughness, in the cases quadratic and to triagular. The experimental study, it was developed from the model considered for Metzner for attainment of p(h) from specter RBS gotten experimentally and analyzed the light of one simulated by the RUMP, being that the analyzed sample was a composed film for Sn and in two situations: with and without baking, and its surfaces were analyzed through Atomic Force Microscopy (AFM). The analysis for attainment of p(h) was made from a set backscattering angles, that were possible thanks to a mobile system of detectors, developed for such purpose.

[02/09/03 - Poster]

Neutron Flux Spectrum Assessment in an Am-Be Neutron Irradiator

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A small neutron irradiator prototype is being developed at IPEN's facilities (Instituto de Pesquisas Energéticas e Nucleares - Brazil) so that it can be used outside the reactor premises. Basically, this prototype consists of a $1200mm$ long cylinder with $985mm$ diameter (filled with paraffin) with two Am-Be sources ($\sim 600GBq$ each) arranged in the longitudinal direction of its geometric center. The material to be irradiated can be positioned in different positions at a radial direction of the cylinder between the two $AmBe$ sources. The development of appropriate nuclear instrumentation to perform neutron activation analyses using fast neutrons can be useful to perform neutron dosimetry, to investigate materials outside the reactor premises and for detector testing. The use of this irradiator presents the advantage of supplying a stable neutron flux for long periods, so that it eliminates the need of using standard materials in quantitative analyses. This way induced activity measurements in the irradiated material become agile, practical and economic. To establish the prototype specifications, the neutron flux distribution was calculated using the MCNP-4C. In order to validate these results for a wide range of energies, measurements with activation foils were performed, and the agreement between the experiments and the MCNP simulation is discussed.

[02/09/03 - Poster]

On the Origin of the Satellites Peaks in Alpha Particle Spectra

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The widespread study on silicon diodes performance in the spectrometry of charged particles is due to the possibility of their use as a research tool both in laboratory and in industrial applications as the measurement of the isotopic ratios between chemical elements. In order to employ this technique in studies related to reactor fuel elements and their properties after irradiation, we have been studying the response of silicon diodes for alpha spectrometry.
The devices studied during this work were: a S3590-06 PIN photodiode (*Hamamatsu*) and an implanted silicon diode (type Al/n^+/p/n/Al) manufactured at CERN. The diodes were housed inside a stainless steel vacuum chamber and its electric leads were connected to the charge sensitive preamplifier (based on an integrated circuit A250 from *Amptek*) whose output was further amplified and shaped and finally fed to a multichannel analyzer.
In order to verify the performance of the S3590-06 photodiode (which bears two guard rings) for heavy charged particle spectrometry, several energy spectra were recorded using a 5.5kBq mixed alpha source of ^{239}Pu, ^{241}Am and ^{244}Cm. The experimental results showed that, even at room temperature and without reverse bias, the alpha particles of the principal group of each isotope were observed. Even though the good influence of the bias voltage on photodiode energy resolution was evidenced (FWHM = 17.4keV for the 5.486Mev line from ^{241}Am), the results revealed some unexpected low intensity peaks spaced about 200keV below each of the three main peaks.
The origin of these satellites peaks were firstly thought to be due to incomplete charge collection in weak electric fields around the edges of the diode, near the guard ring region. So, one should expect that the relative intensity of