XXXIII Reunião de Trabalho sobre Física Nuclear no Brasil

Programa e Resumos

7 a 11 de Setembro de 2010
Campos do Jordão, SP, Brasil

Realização

SBF
SOCIEDADE BRASILEIRA DE FÍSICA

Apoio

FAPESP CNPq FAPERJ Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro

Centro latinoamericano de Física
Centre Latino-Américain de Physique
Centro Latino Americano de Física
CLAF

CAPES CNEN Eletrobras Eletronuclear

CARVALHO, *Universidade de São Paulo* ■In health area animal models are used to perform clinical investigations, for example, to test new medicines for medical diagnostic and treatment investigations before to be applied in human being. Currently, the conventional biochemistries analyses are performed using serum, but when small size animal model is involved the biological material can be scarce restricting its collection. In the last years the AAN, has been successfully applied at LEER at IPEN for investigation of several elements in blood of small sized animals, resulting in an efficiency procedure for clinical practice. The advantage in using whole blood is relate to the fact that this nuclear procedure needs small quantity of biological material (10 to 100 ?L of whole blood) when compared with the conventional analyses (0.5 to 1.0 mL of serum). But, to use whole blood to perform these biochemistry investigations it is essential to establish the reference value in blood for the species or animal models. In this study we intend to evaluate a normal range of Br, Ca, Cl, K, Mg and Na concentrations in whole blood using NAA in samples of DMDmdx and C57B/6J mices model used for muscular dystrophy investigations. Thirty whole blood samples were analyzed in the IEA R1- nuclear reactor at IPEN (São Paulo, Brazil). These data contribute for applications in veterinary medicine related to biochemistry analyses using whole blood.

[10/09/10 - 17:00h - Sala 2]

Experiment planning of subcritical reactivity determination using high order statics of neutron counting., ANDRÉ DA SILVA SERRA, PAULO PASCHOLATI, *Instituto de Física, IPEN*, ADIMIR DOS SANTOS, *IPEN* ■The reactivity measurement of subcritical fissile arrangements (subcriticality) is a featured subject among those in reactor physics, because it is necessary to safely handle, process, and transport fissile material from nuclear installations. This issue is getting increasing interest between many researchers, because the recent interest in accelerator driven systems (ADS) has increased the demand for stable subcriticality measurements. In spite of this, none of the many methods of subcriticality measurements used nowadays allows its direct determination; however, the third order correlation of neutron counting allows subcriticality estimation from a fissile material without any previous knowledge of its kinetic parameters or any pulsed neutron source. In spite of its intrinsic advantages, high order statistics requires a careful planning and an optimized procedure, because this type of experiment demands a long acquisition time. It is estimated that such procedure could ask for acquisition times a few orders of magnitude longer than those required by the usual methods of subcriticality estimation (for similar uncertainties). The main experimental results of this work, undertaken in the IPEN/MB-01 facility (a zero power reactor), which agreed with the simulated results obtained by dedicated Monte Carlo codes, were: the necessary time for data acquisition in order to obtain an useful result (hundreds hours of acquisition time), and the higher efficiency of using saturation time channels different from those normally used by others researches.

[10/09/10 - 17:20h - Sala 2]

STUDY ON DETERMINATION OF ANTIMONY IN ENVIRONMENTAL SAMPLES BY NUCLEAR TECHNIQUE NEUTRON ACTIVATION ANALYSIS, TASSIANE CRISTINA GOMES MARTINS, MITIKO SAIKI, *Instituto de Pesquisas Energéticas e Nucleares-IPEN* ■The Interest on determination of antimony in environmental samples has increased significantly in recent years due to the impact caused by human activities and their potential cumulative toxic at low concentrations, apart from not having known biological function. However, the quantification of antimony has interference problems due to low concentrations that hinder its analysis. Therefore becomes of great interest to establish adequate procedures for neutron activation analysis (NAA) to obtain reliable results in environmental samples. In this context, reference materials INCT-TL-1 Tea Leaves, INCT-MPH -2 Mixed Polish Herbs, CTA-VTL-2 Virginia Tobaco Leaves, White Cabbage BCR-679, IAEA 140/TM Seaweed (Focus sp), IAEA -SL-1 Lake Sediment and IAEA-336 Lichen, were selected for analysis and evaluation of results. Aliquots of these standard synthetic materials and antimony were irradiated in the nuclear research reactor IEA-R1 under thermal neutron flux of approximately 5 x 1012 cm-2 s-1 for a period of 8 or 16 hours. After appropriate decay time, the induced gamma activity of the irradiated samples and standard was measured using hyperpure Ge detector coupled to the digital spectrum analyzer DAS 1000, both from Canberra. The radioisotopes measured with gamma ray energies and the half-life were $Sb-122$ ($E\gamma = 564keV; t1/2 = 2.7d$) and $Sb-124$ ($E\gamma = 1692keV; t1/2 = 60.2d$). Antimony concentrations were calculated by the comparative method and the uncertainties of the results were estimated using statistical error of the sample and standard counts Results obtained in these analyses showed a good agreement with certified values and relative errors varying from 0.78 to 13.8%. The values of the standardized difference or Z-scores obtained were lower than 2, indicating that the obtained data were within the range of certified values at a significance level of 68%, demonstrating the suitability of the method used for determination of antimony in this type sample.

[10/09/10 - 17:40h - Sala 2]

Influence of the beam divergence on the quality neutron radiographic images improved by Richardson-Lucy deconvolution, GEVALDO L. DE ALMEIDA, MARIA INES SILVANI, *Instituto de Engenharia Nuclear, CNEN*, RICARDO T. LOPES, *Laboratório de Instrumentação Nuclear, COPPE/UFRJ* ■Images produced by radiation transmission, as many others, are affected by disturbances caused by random and systematic uncertainties. Those caused by noise or statistical dispersion can be diminished by a filtering procedure which eliminates high-frequencies associated to the noise, but unfortunately also those belonging to the signal itself. Systematic uncertainties, in principle, could be more effectively removed if one knows the spoiling convolution function causing the degradation