M149 BIOMONITORING OF CHEMICAL ELEMENTS IN THE ATLANTIC FOREST: PLANT-SOIL CONCENTRATION RATIOS.

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The biomonitoring of chemical elements can be improved by the analysis of soil samples taken under the crown projection of the trees. The accumulation of chemical elements in plants can be better estimated by determining the plant soil concentration ratios (CR), which provides an indication of transfer in the soil/plant system. Besides, the uptake from soil can lead to erroneous interpretations, since the soil itself can present a high concentration of the chemical element being evaluated. The Atlantic Forest is considered one of the hottest hotspot of the global biodiversity, comprising the whole latitudinal extension of the Brazilian territory. This vegetation is characteristic of typical oligotrophic ecosystems, with soils having poor nutrient contents, elevated acidity and high organic matter levels. In this study, leaves of 120 trees from 14 species and soil samples from two different depths (0 10 and 10 30 cm) were evaluated by instrumental neutron activation analysis (INAA). The species from the same habitat showed similar CR values for nutrients (Ca, K, and Zn) and trace elements (Ba, Br, Co, Cs, Na, Rb and Sr). Although the nutritional analysis of soils has indicated a low availability of potassium, the CRs for some species, considering the total potassium content in soil (about 24 g kg-1), were higher than 1. It could be observed that the plants are able to accumulate chemical elements in leaves, providing a continuous cycling within the biological compartment of the ecosystem. The actions for monitoring chemical elements in the plant/soil system seems to be quite promising for the comprehension of biodiversity and for its conservation in the Atlantic Forest.

M150 DETECTION LIMITS IMPROVEMENTS AT THE UNIVERSITY OF TEXAS PGAA FACILITY.

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Work has been conducted at The University of Texas at Austin (UT) to improve the detection capabilities of the Prompt Gamma Activation Analysis (PGAA) facility. The PGAA facility utilized the cold neutron beam from the UT TRIGA reactor. Multiple background measurements and sample blank measurements were taken so that the various sources of background could be identified and quantified. When possible the background sources were determined at a high degree of precision so that they could be subtracted from sample measurements with minimal uncertainty propagation. Detection limits and background interferences for a number of elements including H, B, Be, Li, N, and O have been determined.

M151 OPTICAL ABSORPTION SOURCE STUDIES IN HIGH PURITY SAPPHIRE USING NEUTRON AND X-RAY PROBES.

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We report recent results from our program of measurements to obtain physical correlations betwe chemical impurities and optical absorption characteristics in sapphire under consideration for use as t mass material in advanced versions of the Laser Interferometer Gravitational-wave Observatory (LIG The projected ~800kW of power to be stored in the interferometer arms, require that the absorption 1064nm, the wavelength of the laser, be kept as low as possible in order to minimize thermally induc structural distortions in the optics. Sapphire, because of its optical, mechanical and thermal properti remains a candidate material for this part of the project. Transition metal elements, such as Ti, Cr, F Co, Ni, etc., even when present in trace amounts, are of particular concern since they are known sourc of absorption in this material. The availability of high intensity slow neutron facilities and hard X-r synchrotron radiation sources, coupled with high efficiency photon and charged particle spectromete have enabled our determination of trace elements well below the parts-per-million level. In t presentation we describe our use of neutron depth profiling (NDP), instrumental neutron activati analysis (INAA) and total X-ray reflection fluorescence (TXRF) to investigate the trace eleme composition and spatial distribution in sapphire grown by the heat exchanger method (HEM™). T ultimate objective of this study is to obtain an improved understanding of the detailed mechanisms which optical radiation undergoes absorption in sapphire.

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