conditions and at varying gas pressures, make it possible to determine quantitatively the components of the background of gas proportional counters. The results of such measurements are presented and their consequences discussed.

GAMMA RADIATION FLUX IN RADIOCAROBN DATING LABORATORIES USING GAS PROPORTIONAL COUNTERS MEASURED WITH AN NaI CRYSTAL INSIDE AND OUTSIDE THE PASSIVE SHIELD

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A comparison of a large number of gas proportional counting systems used for radiocarbon dating has shown that there is large scattering in the background of similar systems. In order to find the cause of this scattering, the gamma background spectrum has been measured with a 2" × 2" NaI low-level crystal outside and inside the passive shield of a few low-level laboratories. A discussion of the spectra and the cause of the difference in the background of the gas proportional counters is presented.

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REDUCTION OF CO_2-TO-GRAPHITE CONVERSION TIME FOR ^{14}C AMS SAMPLES

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Today, graphite is the most common type of carbon target for accelerator mass spectrometry (AMS). Graphite is produced by reduction of CO_2 by various methods, and it is a well-known phenomenon that the presence of a small amount of impurities (eg, sulphur compounds) may retard the reaction.

We present here some procedures that have considerably decreased the average reduction time for CO_2 from various types of sample material. In particular, CO_2 obtained by combustion of organic samples, such as plant macrofossils, wood and gelatin, showed previously large variations in reduction time (up to about 7 hours). Several methods of CO_2 purification have been tested. The most efficient is the presence of water vapor during combustion. Including the effect of a modified version of the sample preparation system, the CO_2-to-graphite conversion time, in general, was reduced by more than a factor of three for samples in the range of 300 μg to 2 mg carbon. Measurements on background samples have shown that ^{14}C contamination during sample preparation did not increase by the implementation of these procedures, which are now used routinely during preparation of targets that are ^{14}C AMS dated in Uppsala, Sweden.