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Performance report of the NTUAMS Lab during 2020-2024

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The AMS 14C dating Lab (Lab code is NTUAMS) in the Department of Geosciences at the National Taiwan University was established in 2012 equipped with a 1.0 MV Tandetron Model 4110 BO-Accelerator Mass Spectrometer (AMS) made by High Voltage Engineering Europa B.V. (HVE) in Netherlands. Since 2013, the lab has been providing 14C dating on organic and inorganic carbon samples including sediment and peat cores, stalagmites, foraminifera shells, bones, etc. We have built up three graphitization lines and a home-made semiautomatic EA-graphitization system for producing graphite. In order to avoid 2Li+ interference, the AMS is running 14C3+ mode with a transmission rate of 18% instead of 14C2+ which has a transmission rate of 48%. For each batch of samples, at least three OXII, three background samples (BKG made from anthracite for organic carbon and NTUB made from limestone for inorganic carbon) and two known-age inter-comparison samples (distributed by University of Glasgow) were measured together. This study presents a total of 5050 graphite targets measured during 2020²024. The target numbers measured in 2020, 2021, 2022, 2023 and 2024 (four months) were 1356, 1357, 1164, 1159 and 435, respectively. From the data results, the summaries of OXII, BKG, NTUB, inter-comparison samples are given. The AMS has a blank 14C/12C ratio between 5e-16 and 2e-15. The 14C/12C ratios of OXII, BKG and NTUB are about 1.2e-12, 6e-15 and 4e-15, respectively. The measured ages of the inter-comparison samples agree well with their consensus values. A recent study of our lab on a known historic archaeological site in central China illustrates that the 14C ages of bone collagen and charcoal samples not only agree well with the late Shang dynasty, but also time difference from the two sub-sites in the area. With our reliable 14C dating facility, many applications in geology, archaeology, environment and synthetic industry have been done.

Keywords: NTUAMS Lab, standard and background, inter-comparison samples, semi-automatic graphitization system, applications

Student Submission

No

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