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Development of AMS 14C dating preparation laboratory at the Beijing Normal University

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The development of the AMS 14C dating preparation laboratory has been completed in the Beijing Normal University (BNU). There are 2 lines of home-made CO2 generation vacuum systems and 4 lines of home-made graphitization vacuum systems. For CO2 generation, a pyrolysis-combustion vacuum system with an infrared gas analyzer, ultrapure O2 and Ar gas supply systems, a manometer with a pressure transducer to measure pressure variations from vacuum (-760 mmHg) to ˜2.5 atmospheric pressure, a CO2 purification system and a 12-port vacuum line to extract and are installed. These vacuum systems are used together with other apparatus to extract variable organic and inorganic carbon fractions through thermal decomposition and fractional acid reaction for AMS 14C dating analysis. For graphitization, 44 close-spaced hydrogen-iron reaction vessels to reduce CO2 are installed in 4 vacuum lines each with online monitoring systems on a dozen of CO2 reduction rate simultaneously, ultrapure H2 gas supply systems, CO2 purification systems, and a manometer with a pressure transducer to measure pressures from vacuum (-760 mmHg) to 2.2 atmospheric (30 psi) ranges on each vacuum lines. By the mid-2024, the BNU 14C preparation laboratory had completed >500 graphitization of unknown-aged organic, inorganic, and bone collage sample preparation with nearly 200 standard, blanks, and other testing specimens. The BNU-AMS 14C preparation laboratory begins to provide AMS 14C dating services for samples of gas, water DIC, soil, loess, dune sand, lacustrine, wood shaving, charcoal fragment, organic remains, bone collagen, tooth enamel bioapatite, carbonate minerals, eggshells, stalagmite, and tufa samples.

Student Submission

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