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EnvironMICADAS C-14 AMS Gas ion source performance and its applications at HEKAL Laboratory, Debrecen, Hungary

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A coupled accelerator mass spectrometer - gas interface system successfully has been operating at the Hertelendi Laboratory of Environmental Studies, Debrecen, Hungary since 2013. Over the last 6 years more than 500 gas targets were measured below 100 µg carbon content for carbon isotopic composition. The system was tested with blanks, OxII, IAEA-C1, IAEA-C2 and IAEA-C7 standards. The performance of our instrumentation shows good agreement with other published gas-interface system data and also shows a quite good agreement with the nominal value of international standard samples. There is a measurable but quite small memory effect after modern samples, but this does not significantly affect the final results. Typical ion currents at the low energy side were between 10-15 µA with a 5% CO₂ in He mixing ratio. The relative errors average ±6% for samples greater than or equal to 10 µgC sample with mean count rates of 300 counts per microgram C for OxII. The blank is comparable with other systems, which is 0.0050 ± 0.0018 F¹⁴C or 34000-47000 yr BP, which allows for the routine measurement of both of small environmental and archeological samples.

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