# A Liquid Sample Interface for Rapid 14C Analysis by Accelerator Mass Spectrometry

T.P. Guilderson (presenting), T. Ognibene, A. Thomas, P. Daley, and G. Bench
Center for Accelerator Mass Spectrometry, Lawrence Livermore National Laboratory

Current Accelerator Mass Spectrometry (AMS) measurement has typically required that carbon containing materials be converted to graphite for analysis. Considerable human handling is required, and the process suffers from low sample throughput (<100 samples processed per day) and long turnaround times (~2 days) at a current cost of hundreds of dollars per sample. Many users have been slow to adopt AMS because of the high cost and complexity of sample preparation and resulting slow turnaround times for analysis.

A technological need, widely voiced by industrial and academic investigators in recent years, has been for a user-friendlier AMS interface, including far less cumbersome sample preparation. To facilitate sample preparation and reduce analysis times from days to minutes, we have developed an online, directly-coupled, liquid sample interface that allows analysis without first converting a sample to graphite. The liquid sample interface rapidly converts the carbon content of samples suspended or dissolved in a liquid to CO2 gas and directly transports the gas to a gas-accepting ion source for real-time 14C AMS analysis. This interface eliminates complex and time-consuming human handling of samples and enables direct coupling of an HPLC or other liquid separation technology to the spectrometer for real-time AMS analysis. The ability to handle liquid samples and continuous flows of liquid will enable more widespread and routine use of AMS in biological and environmental applications.