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DETERMINING 210Pb BY ACCELERATOR MASS SPECTROMETERY

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Beams of PbF3- ions were produced initially using the 834 ion source at IsoTrace with targets of PbF2. Since a large count rate of common Pb could interfere with measurement of the rare 210Pb isotope we examined alternative target preparation chemistry to produce 210PbF3- beams. Beams of 150 to 175 nA of 208PbF3- were measured in targets prepared by adding the Pb to HF(aq) and equal parts of CsF and AgF2 and dried in a clean Savillex container. Although, this ion beam produces the highest counts of 210Pb, the factors controlling the beam stability require further study. 210Pb was detected in the +3 charge state using a conventional gas ionization detector at the IsoTrace Facility. Interference from the sum peak of 70Zn and 140Ce was measured in some targets. An anion exchange column separation was developed to separate 210Pb from 70Zn and 140Ce. Using this technique the sum peak of 70Zn and 140Ce was almost completely eliminated. We tested two different approaches to quantify the 210Pb concentration: (1) Measuring the 210Pb:205Pb ratio after adding 7.2pg of 205Pb, and (2) Measuring the 210Pb:208Pb ratio after adding 100µg of 208Pb and using a calibration curve coupled with the measurement of the concentration of 208Pb by ICPMS. The measurement of 205Pb was difficult because of 205Tl interference and molecular interferences at mass 205. Using the second technique, initial measurements of 210Pb in the CLV1 standard reference material agreed with the certified value of 660mBq g-1. Further work, using the high resolution injection magnet at the A. E. Lalonde AMS Laboratory at the University of Ottawa will improve the precision of these measurements.

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