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Carbon-14 Graphitization Chemistry JAMES MILLER, PHILIPPE COLLON, JAY LAVERNE, University of Notre Dame — Accelerator Mass Spectrometry (AMS) is a process that allows for the analysis of mass of certain materials. It is a powerful process because it results in the ability to separate rare isotopes with very low abundances from a large background, which was previously impossible. Another advantage of AMS is that it only requires very small amounts of material for measurements. An important application of this process is radiocarbon dating because the rare ^{14}C isotopes can be separated from the stable ^{14}N background that is 10 to 13 orders of magnitude larger, and only small amounts of the old and fragile organic samples are necessary for measurement. Our group focuses on this radiocarbon dating through AMS. When performing AMS, the sample needs to be loaded into a cathode at the back of an ion source in order to produce a beam from the material to be analyzed. For carbon samples, the material must first be converted into graphite in order to be loaded into the cathode. My role in the group is to convert the organic substances into graphite. In order to graphitize the samples, a sample is first combusted to form carbon dioxide gas and then purified and reduced into the graphite form. After a couple weeks of research and with the help of various Physics professors, I developed a plan and began to construct the setup necessary to perform the graphitization. Once the apparatus is fully completed, the carbon samples will be graphitized and loaded into the AMS machine for analysis.

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