Abstract Submitted
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Intracavity Optogalvanic Spectroscopy System for Radiocarbon Analysis[1] GUSTAVO ARIAS, MARK DEGUZMAN, SHARON EVANGELINA, ALESSANDRA PANUCCIO, JOSHUA THOMPSON, DANIEL MURNICK, Rutgers Univ - Newark — An improved intracavity optogalvanic spectroscopy (ICOGS) system (Daniel E.Murnick, Ozgur Dogru and Erhan Ilkmen, *Analytical Chemistry*, **80**, 4820-4824 (2008)) for ^{14}C analysis is under development. A new discharge excitation and monitoring circuit with extremely stable voltage and current characteristics provides long term system stability and reproducibility. To ensure quality data, many dependent parameters are optimized including: gas pressure, gas flow, and a CO_2 sample injection protocol. Control measurements are carried out using CO_2 free air and 1% CO_2 in air standards. The ICOGS signal consists of the $^{14}CO_2$ contribution plus backgrounds from both the standard air and the dominant stable carbon isotopes. We have developed a mathematical vector deconvolution model in order to quantify precisely the $^{14}CO_2$ component of the ICOGS signal. We determine each component via vector decomposition to calculate the laser induced change in discharge impedance due to the presence of $^{14}CO_2$. Our objective is to develop a calibration curve in order to obtain accurate measurements for small unknown samples of CO_2. Such measurements will be useful in many fields, such as radioactive tracing in biology and medicine and monitoring the concentration of radiocarbon in the atmosphere.

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