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CO_2 TEA Laser-Enhanced Laser Ablation Molecular Isotopic Spectrometry (TELLAMIS)[1] STACI R. BROWN, CHARLEMAGNE A. AKPOVO, Department of Physics, Florida A&M University, ALAN FORD, Alakai Defense Systems, KENLEY HERBERT, Department of Chemistry, Florida A&M University, LEWIS JOHNSON, Department of Physics, Florida A&M University
— Recently, it has been shown that the relative abundance of isotopes in enriched materials can be determined via laser-induced breakdown spectroscopy (LIBS) in a technique known as laser-ablation molecular isotopic spectroscopy (LAMIS). The original LAMIS work has focused on single-pulse (SP) LIBS for the excitation. However, dual-pulse (DP) LIBS reduces shot-to-shot variation and can lower detection limits of an element by about an order of magnitude or more. It also has the potential to improve the accuracy of the determination of the relative abundances of isotopes in LAMIS by minimizing the signal-to-noise ratio. In this work, a DP-LIBS technique for improving LAMIS relative-abundance information from a sample is presented. The new technique, called (TEA) Transverse-Excited breakdown in Atmosphere Laser-Enhanced Laser Ablation Molecular Isotopic Spectrometry (TEL-LAMIS), uses a carbon dioxide (CO_2) laser to increase the breakdown emission from LIBS in the LAMIS method. This technique is demonstrated on a collection of relative abundance isotopes of boron- 10 and boron-11 in varying concentrations in boric acid. Least-squares fitting to theoretical models are used to deduce plasma parameters and understand reproducibility of results.

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