ALUMINUM/AIR CHEMISTRY INDUCED BY PULSED LASER HEATING AND INVESTIGATED BY REAL-TIME EMISSION SPECTROSCOPY

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Aluminum/air chemistry was investigated through time-resolved emission spectroscopy. The reaction was induced with 20 J/cm^2 of laser energy with 8 μs duration at 632 nm. Real-time spectra are collected from a single ablation process. Chemical events are monitored for times up to 100 μs duration, and a maximum temporal resolution of 100 ns. Time-resolved emission from electronic transitions of Al, and the vibro-electronic transitions of AlO at 380-600 nm were observed. The time-evolution of the Al doublet at 394/396 nm, and the B - X transitions of AlO from 460-520 nm are obtained. These spectroscopic results are used to monitor changes in the atomic and molecular states in time. Furthermore, decomposition processes associated with pulsed laser heating are inferred. Details of the experimental technique, and its applicability to study other short lived molecules in real time will be presented.