TIME-RESOLVED FTIR AND MASS SPECTROSCOPY OF LASER-ABLATED MAGNESIUM.

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Laser-ablated Magnesium (Mg) was subjected to time-resolved Fourier transform emission spectroscopy combined with quadrupole mass spectroscopy. Emission of Mg atoms was observed in 2000 $\sim$ 4000 cm^{-1} region with resolution of 0.03 cm^{-1}. It was found that emission lines consist of two components with different Doppler width. One with wider linewidth appeared just after ablation, while the other appeared after about 10 μs. Doppler width of the narrow one corresponds to estimated velocity of atoms sputtered directly from bulk Mg. Mass spectra suggested major products of the ablation under our experimental conditions are Mg^+ and $Mg_2{}^+$. MgO^+ was also observed in the mass spectra under thin oxygen condition ($\sim 10^{-4}$ Torr). Considering the linewidth and energy levels of these species, the wide component is attributed to Mg atoms produced by dissociative recombination of MgO^+ and electrons. Information about the electronic energy level of MgO^+ was also obtained, which is compared with *ab initio* calculations.