

COLLISION-INDUCED ABSORPTION OF OXYGEN MOLECULE AS STUDIED BY HIGH SENSITIVITY SPECTROSCOPY

WATARU KASHIHARA, ATSUSHI SHOJI, AKIO KAWAI, *Department of Chemistry, Tokyo Institute of Technology, Tokyo, Japan.*

Oxygen dimol is transiently generated when two oxygen molecules collide. At this short period, the electron clouds of molecules are distorted and some forbidden transition electronic transitions become partially allowed. This transition is called CIA (Collision-induced absorption). There are several CIA bands appearing in the spectral region from UV to near IR. Absorption of solar radiation by oxygen dimol is a small but significant part of the total budget of incoming shortwave radiation. However, a theory predicting the lineshape of CIA is still under developing. In this study, we measured CIA band around 630 nm that is assigned to optical transition, $a^1\Delta_g(v=0):a^1\Delta_g(v=0)-X^3\Sigma_g^-(v=0):X^3\Sigma_g^-(v=0)$ of oxygen dimol. CRDS(Cavity Ring-down Spectroscopy) was employed to measure weak absorption CIA band of oxygen. Laser beam around 630 nm was generated by a dye laser that was pumped by a YAG Laser. Multiple reflection of the probe light was performed within a vacuum chamber that was equipped with two high reflective mirrors. We discuss the measured line shape of CIA on the basis of collision pair model.