

MILLIMETER WAVE SPECTROSCOPY OF THE CoCO RADICAL PRODUCED IN A SUPERSONIC JET EXPANSION BY THE ULTRAVIOLET PHOTOLYSIS OF Co(CO)<sub>3</sub>NO.

TOSHIHIDE HIKIDA, KENSUKE HARADA, KEIICHI TANAKA, and TAKEHIKO TANAKA, *Department of Chemistry, Faculty of Science, Kyushu University 33, Hakozaki, Higashiku, Fukuoka 812-8581, Japan.*

Rotational transitions of the CoCO radical were observed by millimeter wave spectroscopy. The CoCO radical was produced in a supersonic expansion by the ultraviolet photolysis of Co(CO)<sub>3</sub>NO. The  $J = 8.5 - 7.5$ ,  $9.5 - 8.5$ ,  $10.5 - 9.5$ , and  $11.5 - 10.5$  rotational transitions in the  $\Omega = 5/2$  spin state of the  $X^2\Delta_i$  electronic ground state were assigned in the 75-130 GHz region. Each rotational transition was split into 8 hyperfine components due to the electron orbital-nuclear spin interaction, electron spin-nuclear spin interaction, and nuclear quadrupole interaction of the Co atom. The  $\Lambda$ -type doublet was not resolved in the  $\Omega = 5/2$  spin state. Effective molecular constants for the  $\Omega = 5/2$  spin state, including rotational constant,  $B$ , centrifugal distortion constant,  $D$ , nuclear quadrupole interaction constant,  $eQq$ , and the linear combination,  $a + (1/4)b + (1/6)c$ , of the electron orbital-nuclear spin interaction  $a$ , Fermi contact interaction  $b$ , and magnetic dipole interaction of the electron spin and nuclear spin  $c$ , were determined by the least squares fitting of the observed spectrum.