ROTATIONAL AND HYPERFINE ANALYSIS OF THE $a^1\Delta_g \leftarrow X^3\Sigma_g^-$ BAND OF ^{17}O-CONTAINING ISOTOPOLOGUES OF OXYGEN MEASURED BY CRDS AT ROOM AND LIQUID NITROGEN TEMPERATURES

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The $a^1\Delta_g \leftarrow X^3\Sigma_g^-$ system of the $^{16}O^{17}O$, $^{17}O^{18}O$ and $^{17}O_2$ isotopologues of oxygen was studied by high sensitivity CW-Cavity Ring Down Spectroscopy. The spectra of a ^{17}O highly enriched sample were recorded at room temperature between 7640 and 7917 cm^{-1} and at liquid nitrogen temperature in the 7876-7893 cm^{-1} region. The magnetic dipole (0-0) band was observed for all three ^{17}O-containing isotopologues. At liquid nitrogen temperature some of the transitions were observed with partially resolved hyperfine splitting due to the ^{17}O nuclear spin, allowing determination of the hyperfine constants. The electric quadrupole (0-0) band and the (1-1) magnetic dipole hot band were also observed for the $^{16}O^{17}O$ and $^{17}O_2$ species. The rotational and hyperfine spectroscopic parameters of the $X^3\Sigma_g^-$ and $a^1\Delta_g$ states of the three studied isotopologues were derived from global fit of the measured line positions and microwave and Raman measurements available in the literature. The rotational constants of the $a^1\Delta_g$ (v=0, 1) states of $^{17}O_2$ are determined for the first time.