TERM ENERGIES, LINE POSITIONS, AND SPECTROSCOPIC CONSTANTS FOR THE OH MEINEL BAND SYSTEM

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High resolution spectra of OH Meinel bands emitting in the region of 571-993 nm have been observed in spectra of the night sky using the HIRES echelle spectrograph on the Keck I telescope on Mauna Kea, HI. Line positions in the 6-1 and other bands, measured with an accuracy of 0.01 cm^{-1}, are in excellent agreement with line positions calculated from the molecular constants of Abrams *et al*[a] and listed in the HITRAN data base[b] for lines measured in the main branches with J $<$ 10.5. However, for transitions accessing higher rotational levels in the main branches, or any rotational levels in the satellite branches, substantial discrepancies, up to 0.14 cm^{-1}, are found between the observed lines and their positions expected from these data bases. In an effort to determine the source of these discrepancies, the 1696 reported line positions of the 23 Meinel bands measured by Abrams *et al* were subjected to a model-free least-squares fit to determine experimental term energies for OH X(v=0-10). With few exceptions, those line positions are found to be exceptionally precise, yielding a standard deviation in the fit of 0.001 cm^{-1}. Referenced to the accurate term energies of Melen *et al*[c] for v=0-3, the experimental line positions of Abrams *et al* yield term energies for v=4-10 that are consistent with the present observations and with the term energies of Coxon[d] but not with the calculated term energies reported by Abrams *et al*, or with those used to generate the HITRAN transitions for v $>$ 3. Molecular constants for the $X^2\Pi$ state are also determined from the line positions of Abrams *et al* which reproduce both the experimental term values and the present Meinel observations, and are consistent with the rotational constants calculated from the $X^2\Pi$ potential energy curve.

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