High Resolution FTIR Spectroscopy of the PO Radical

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The high resolution ($0.0035 cm^{-1}$) spectrum of PO for the fundamental band in the ground electronic state ($^2\Pi_r$) was observed using IFS120HR Fourier transform spectrometer with a White-type discharge absorption cell. The effective optical length was 16 m. The PO radical was generated in a AC discharge (20kHz, 300mA) plasma of $POCl_3$(40 mTorr)+Ar(500 mTorr). In total of 196 signals were assigned to the P- and R-branch lines of both $\Omega=\frac{1}{2}$ and $\frac{3}{2}$ substates. The Λ-type doubling of the $^2\Pi_{\frac{1}{2}}$ state was well resolved both for P and R branches. Molecular constants of the v=1 excited vibrational state are accuratly determined, and the precision of the rotational constant and centrifugal distortion constant are improved by about one order in comparison with the result of diode laser spectroscopy[1]. Molecular constants of the gound vibrational state are also precisely determined by using the combination difference method together with the microwave data[2].

1. J. Butler, K. Kawaguchi, and E. Hirota J. Mol. Spectrosc. 101, 161 (1983).
2. K. Kawaguchi, S. Saito, and E. Hirota J. Chem. Phys. 79(2), 629 (1983).