A $^1\Sigma^+ - \tilde{X}^1\Sigma^+$ ELECTRONIC TRANSITION OF YOH IN THE VISIBLE REGION

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Excitation spectra of the new molecules YOH and YOD have been recorded in the 500-625 nm wavelength region by laser-induced fluorescence, following reaction of laser-ablated yttrium with H_2O or D_2O under supersonic jet-cooled molecular beam conditions. Rotational analyses of $^1\Sigma^+ - \tilde{X}^1\Sigma^+$ bands near 540 nm at high resolution gave the following substitution structure for the ground state:

$$\tilde{X}^1\Sigma^+: \text{r(Y-O)} = 1.948 \text{ Å}; \text{r(O-H)} = 0.92_1 \text{ Å}.$$

Wavelength-resolved fluorescence spectra have given the ground state vibrational frequencies

$$\text{YOH (YOD): } \nu_2\text{, bend} = 314\ (247)\ \text{cm}^{-1}; \nu_3\text{, YO stretch} = 674\ (654)\ \text{cm}^{-1}$$

No evidence for the ν_1 (OH stretch) mode was observed. Very complicated weak structure at the long wavelength end may possibly correspond to a singlet-triplet transition.