THE VISIBLE SPECTRUM OF IRIDIUM MONOHYDRIDE AND MONODEUTERIDE.

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Iridium-containing moieties are prevalent in asymmetric catalytic systems. For this reason, diatomic Ir containing species have been the subject of both theoretical and experimental studies. We have investigated IrH/D using our laser ablation molecular jet apparatus. After searching from 380 - 820 nm, eight rotationally-resolved bands for both IrH and IrD were observed. The spectra were determined to belong to several $^3\Phi_4$ - $X^3\Phi_4$ transitions. No other spin-orbit components were observed in either the excited or ground states. A global fit of the bands was performed for each molecule. The molecular parameters have been compared with those of the valence isoelectronic molecules, CoH and RhH. Ground state vibrational frequencies have been determined, from dispersed fluorescence spectra, to be $\Delta G_{1/2}$ = 2140(11) cm^{-1} for IrH and ω_e'' = 1609(2) cm^{-1} and $\omega_e x_e''$ = 19.3(5) cm^{-1} for IrD. The ground state bond length of IrH was determined to be 1.603 $\AA$ somewhat in agreement with the theoretical prediction of r_e'' = 1.565 $\AA$ of Dai and Balasubramanian[a].

[a] D. Dai and K. Balasubramanian *New. J. Chem.* 15, 721-726 (1991)