

## RADIATIVE LIFETIMES OF NiH AND CoH

JENNIFER GOTTFRIED and JEFFREY A. GRAY, *Department of Chemistry, Ohio Northern University, Ada, OH 45810.*

Radiative lifetimes have been measured for several excited electronic states of NiH and CoH radicals, which are produced by laser ablation in a pulsed free-jet expansion of argon containing pentane vapor. Known<sup>ab</sup> transitions in the 15,500 to 18,200 cm<sup>-1</sup> region were excited using a pulsed dye laser, and lifetimes varying from approx. 0.5 to 5  $\mu$ s were determined by temporally resolving the fluorescence intensity. The lifetimes of some states depend on rotational level and/or parity. The electronic structure of transition-metal radicals is generally difficult to model or theoretically predict, especially for optically excited states. While observations such as magnetic moments,  $\Lambda$ -doubling, and spin-orbit intervals can aid in understanding perturbations, radiative lifetimes may be a better diagnostic for assigning the spin multiplicity of the excited states when the low-lying states have well-defined spin.

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<sup>a</sup>S. A. Kadavathu, R. Scullman, R. W. Field, J. A. Gray, and M. Li, *J. Mol. Spectrosc.* **147**, 448-470 (1991).

<sup>b</sup>T. D. Varberg, E. J. Hill, and R. W. Field, *J. Mol. Spectrosc.* **138**, 630-637 (1989).