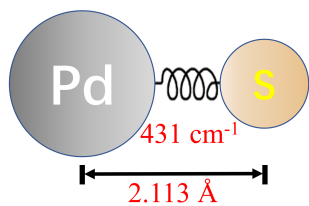


ELECTRONIC SPECTROSCOPY OF THE PREVIOUSLY UNKNOWN PALLADIUM MONOSULFIDE (PdS) RADICAL

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The optical spectra of the diatomic PdS radical in the gas phase have been investigated for the first time through a combination of laser-induced fluorescence (LIF) and single vibronic level emission spectroscopy. The $[22.3] \ ^3\Sigma^- - X \ ^3\Sigma^-$ transition system containing sixteen vibrational bands was identified in the LIF spectra in the energy range of $22,030 - 23,400 \text{ cm}^{-1}$. Rotationally resolved spectra and analysis enabled a determination of the molecular structures in the upper and lower states, involving the rotational constants, the vibrational constants, the spin-orbit splittings, and the vibrational isotope shifts. The emission transitions from the $[22.3]$ state down to the ground state and to the low-lying $A \ ^3\Pi$ state were recorded, by which the spin-orbit splittings of $A \ ^3\Pi_{2,1,0-,+}$ were determined.

A comparison of the bond lengths (and the vibrational frequencies) of the VIII group monosulfide radicals (NiS/PdS/PtS) reveals the relativistic effects in the Pd and Pt atoms.