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 $[22.3]^3\Sigma^+ \rightarrow X^3\Sigma^-$ transition system containing sixteen vibrational bands was identified in the LIF spectra in the energy range of 22,030 – 23,400 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.