

THE QUINTESSENTIAL BOND OF MODERN SCIENCE. THE DETECTION AND CHARACTERIZATION OF DI-ATOMIC GOLD SULFIDE, AuS.

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The gold sulfur bond is becoming ever more important to a vast range of scientific endeavors. We have recorded the electronic spectrum of gas-phase AuS, at vibrational resolution, over the 440-740 nm wavelength range. By application of a synergy of production techniques, hot hollow-cathode sputtering source and cold laser ablation molecular beam source, excitation from both spin components of the inverted  $^2\Pi$  ground state is possible. Excitation into four different excited electronic states involving approximately 100 red-degraded bands has been observed. The four excited states have been characterized as  $a^4\Sigma_{1/2}$ ,  $A^2\Sigma_{1/2}^+$ ,  $B^2\Sigma_{1/2}^-$  and  $C^2\Delta_i$ . The observed red-degraded vibronic bands were then globally analyzed to determine an accurate set of term energies and vibrational constants for the excited and ground electronic states. The electronic configurations from which these states arise will be discussed.