The PERMANENT ELECTRIC DIPOLE MOMENT AND HYPERFINE INTERACTION IN GOLD SULFIDE, AuS

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The bonding and electrostatic properties of gold containing molecules are highly influenced by the large relativistic and electron correlation effects.[a] Here we report on the electricpermanent dipole moment measurement and hyperfine interaction analysis of the $^2\Delta_{3/2}$-$^2\Pi_{3/2}$ and $^2\Delta_{5/2}$-$^2\Pi_{3/2}$ bands of AuS. A cold molecular beam sample of gold sulfide was generated using a supersonic laser ablation source. The electronic bands were recorded at high resolution (35 MHz, FWHM) using laser excitation spectroscopy both field-free and in the presence of a static electric field. The observed hyperfine spectral features were assigned and a set of spectroscopic parameters for the $^2\Delta$ and $^2\Pi$ states were obtained. The Stark induced shifts of selected low-rotational features were analyzed to determine the permanent electric dipole moments in both the ground and excited states.

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[a] P. Pyykko; *Angew Chem. Int[43]* , **4412**,(2004).