

THE MILLIMETER DIRECT ABSORPTION AND FOURIER TRANSFORM MICROWAVE SPECTRUM OF VANADIUM SULFIDE ($X^4\Sigma^-$)

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The pure rotational spectrum of VS ($X^4\Sigma^-$) has been measured with Fourier transform microwave (FTMW) and millimeter-wave direct absorption methods in the frequency range of 5-40 GHz and 210-315 GHz. Discharge assisted laser ablation (DALAS) of a vanadium rod in presence of H₂S gas was used to synthesize the radical in the microwave region. In the millimeter-wave range, the species was produced from the mixture of CS₂ and VCl₄ vapor in a DC discharge. The hyperfine structure was resolved and accurate fine and hyperfine parameters were obtained. Insights into the bonding character can be gleaned from the hyperfine constants, and an estimate of the position of two low-lying interacting electronic states can be obtained from the fine structure parameters. Details of these results will be discussed.