FOURIER TRANSFORM MICROWAVE SPECTROSCOPY OF SCS ($X^2\Sigma$), YS ($X^2\Sigma$) AND VS ($X^4\Sigma$)

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Pure rotational spectra of three transition-metal monosulfides, ScS, YS, and VS, have been recorded using Fourier transform microwave spectroscopy (FTWM) in the range 10-40 GHz. These molecules are all free radicals and have been synthesized in a mixture of H_2S gas with metal vapor, obtained by laser ablation of a metal rod. In the case of ScS and VS, a discharge was necessary to successfully produce the molecules. For YS, the N=1$\longrightarrow$0, 2$\longrightarrow$1, 3$\longrightarrow$2 and 4$\longrightarrow$3 rotational transitions have been recorded. For ScS and VS, the N=1$\longrightarrow$0, N=2$\longrightarrow$1 and N=3$\longrightarrow$2 have been obtained. Vanadium, scandium and yttrium hyperfine structures were resolved for these species. Rotational, fine structure and hyperfine coupling constants have been determined for all three radicals. This works completes the high-resolution pure rotational measurements of 3d transition-metal monosulfides, and provides the most accurate values of the hyperfine parameters for these molecules to date. Bond lengths and spectroscopic parameters will be presented.