LABORATORY DETECTION AND MICROWAVE SPECTRUM of ScC_2 RADICAL (X^2A_1)

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The pure rotational spectrum of ScC_2 (X^2A_1) has been measured using Fourier transform microwave (FTMW) spectroscopy. This is the first study of ScC_2 by any spectroscopic technique. In the FTMW system, the molecule was synthesized using the discharge assisted laser ablation source (DALAS) from a mixture of 0.25 % methane in argon and the ablation of a scandium rod. Spectra of the main isotopologue, ScC_2, as well as $Sc^{13}C^{13}C$ and $Sc^{13}C^{12}C$, have been recorded in the frequency range of 4-60 GHz. Three rotational transitions have been measured, each exhibiting fine structure and hyperfine splittings due to scandium nuclear spin (I =7/2). The data have been analyzed with a $^2A_1$ Hamiltonian and rotational, spin-rotation constants and Sc and ^{13}C hyperfine parameters have been determined. The spectra are consistent with a triangular structure and a $^2A_1$ ground electronic state as predicted by theory. A precise structure will be presented.