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^{51}V NMR Study of the Magnetic Structure of the Frustrated Zig-Zag Spin-1 Chain Compound CaV_2O_4[1] X. ZONG, B.J. SUH[2], A. NIAZI, D.C. JOHNSTON, Ames Laboratory and Department of Physics and Astronomy, Iowa State University, Ames, IA 50011 — ^{51}V NMR measurements have been performed on a single crystal of orthorhombic (at room temperature) CaV_2O_4 in zero applied magnetic field and with a small perturbing field up to $H = 2$ T, at temperatures well below the Néel temperature $T_N = 78$ K. The c-axis is parallel to the chains. At $H = 0$, a broad ^{51}V NMR spectrum with a peak at 237 MHz was observed. The effective local hyperfine field $H_{\rm eff} = 21.2$ T corresponding to the peak frequency 237 MHz is in good agreement with expectation for the V^{3+} $S = 1$ spin state. In $\vec{H} \perp c$, the spectrum splits into two parts that are equally separated from the peak position at zero field. The separation of the parts depends strongly both on the magnitude and direction of $\vec{H}$ with respect to the crystal axes. Our NMR results are consistent with a collinear antiferromagnetic spin structure with the spin direction along the b-axis, which together with the magnetization data suggest that the antiferromagnetic long-range order arises from an order-from-disorder mechanism. We also present the temperature and orientation dependence of the spin-lattice relaxation rate $1/T_1$.

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