

^{31}P NMR Evidence for Two Gapped Spin Chains in $(\text{VO})_2\text{P}_2\text{O}_7$

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We have performed ^{31}P NMR experiments on a spin-1/2 alternating-chain compound $(\text{VO})_2\text{P}_2\text{O}_7$. It is found from analyses of the temperature dependence of NMR line shape, magnetic shift and nuclear spin-lattice relaxation rate at P sites, that this compound has two independent spin components with different spin-gap energies. This suggests that two crystallographically-different V chains, which were thought to be magnetically identical, behave quite differently as independent alternating chains, giving a natural explanation for the existence of two distinct modes in the spin-excitation spectrum.

KEYWORDS: $(\text{VO})_2\text{P}_2\text{O}_7$, NMR, spin gap, alternating antiferromagnet chain