

HIGH RESOLUTION ^{15}N of FERROELECTRIC PHASE TRANSITION IN a SINGLE CRYSTAL of AMMONIUM SULFATE, $(\text{NH}_4)_2\text{H}_2\text{SO}_4$

O. Gunaydin Sen, (NHMFL/FSU, Chemistry and Biochemistry); R. Fu, (NHMFL); N., Dalal, (NHMFL/FSU, Chemistry and Biochemistry)

High Resolution NMR has been used for investigating the paraelectric-ferroelectric transition in $(\text{NH}_4)_2\text{SO}_4$ at $T_c \sim 223\text{K}$. Initial ^{15}N spectra were obtained on a Bruker DMX600 NMR spectrometer, but detailed measurements were made with a Varian UNITY_{INOVA} 500 MHz wide-bore system. Variable temperature experiments with ^1H - ^{15}N cross polarization and proton decoupling with spinning speed of 5 kHz have been carried out. Figure 1 shows the spectra around the phase transition. The isotropic chemical shift exhibits an approximately linear temperature dependence within 2K of T_N , and then changes discontinuously, followed by another dependence which is shown in figure 2. The sharp anomaly around T_N implies that the NH_4^+ ions undergo a displacive transition at T_N . This result provides a new avenue for studying ferroelectric transitions. 2D experiments will be performed to understand the phase transition mechanism better.

Figure 1. ^{15}N MAS NMR spectra of $(\text{NH}_4)_2\text{SO}_4$ at different temperatures.

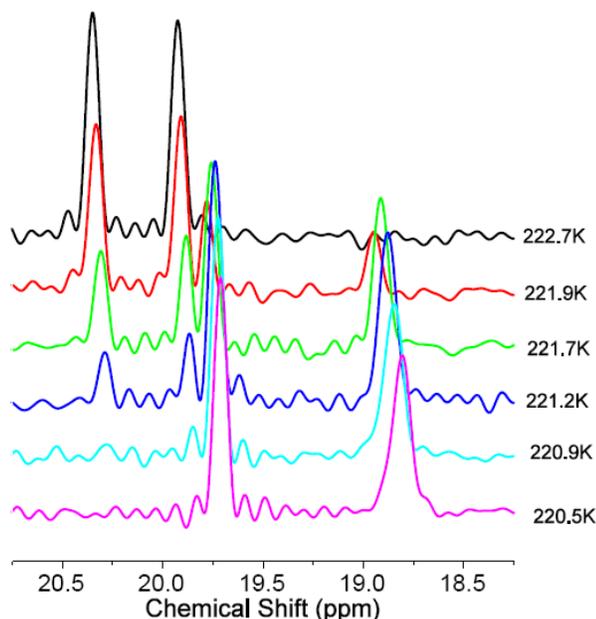


Figure 2. Plot of ^{15}N chemical shift of $(\text{NH}_4)_2\text{SO}_4$ as a function of temperature.

