Supporting Information to: Structural Investigations of $MA_{1-x}DMA_xPbI_3$ mixed-cation perovskites

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Table of contents

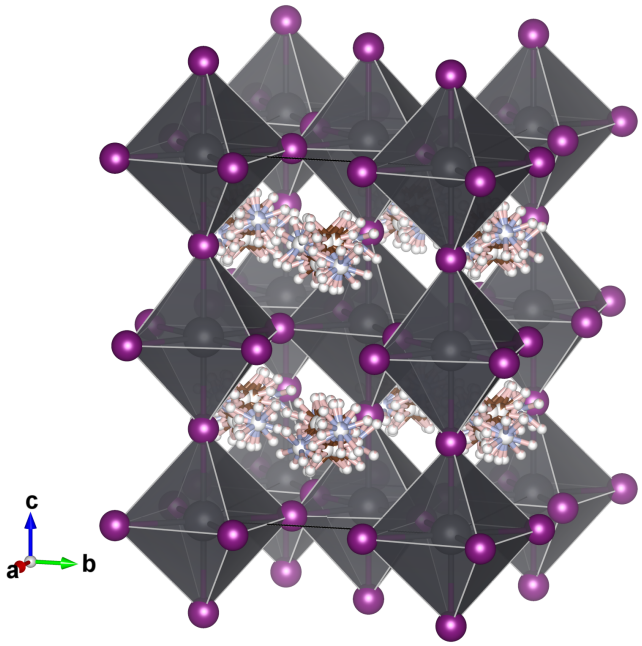

Figure S1: Room temperature crystal structure of $MAPbI_3$.

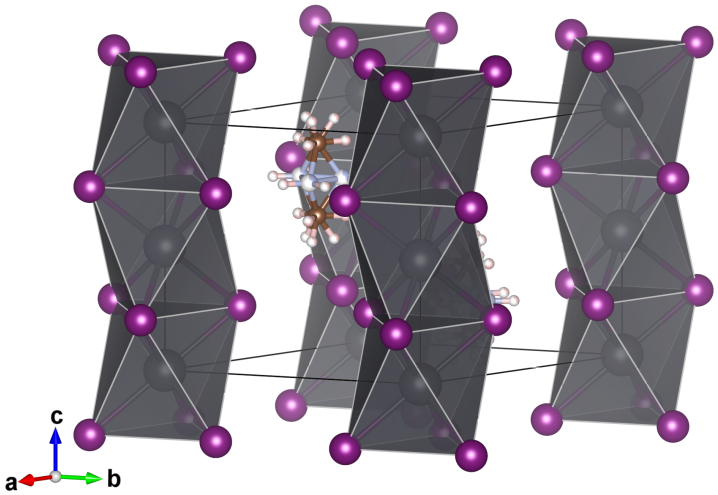

Figure S2: Room temperature crystal structure of $DMAPbI_3$.

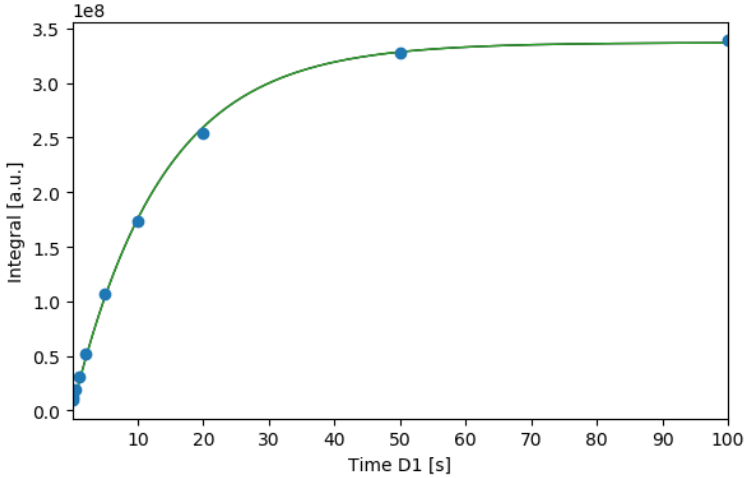

Figure S3: ^{1}H saturation recovery T_1 measurement of $MAPbI_3$. Measured at 20 T and 22 kHz MAS.

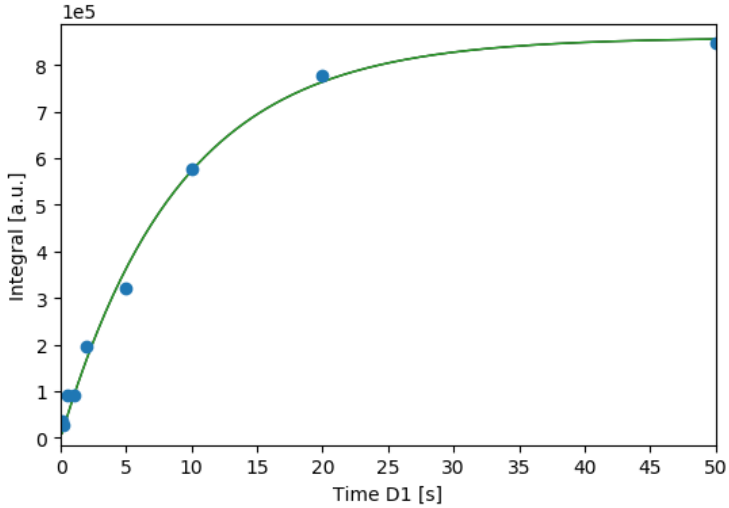

Figure S4: ^{13}C saturation recovery T_1 measurement of $MAPbI_3$. Measured at 20 T, 80 kHz ^{1}H decoupling, and 22 kHz MAS.

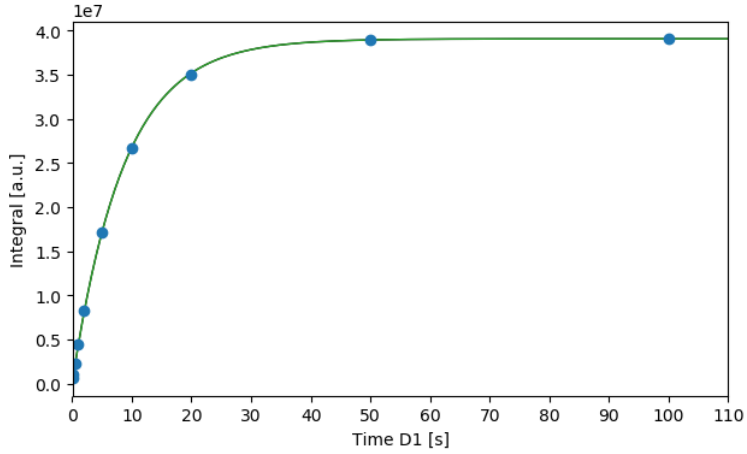

Figure S5: ^{1}H saturation recovery T_1 measurement of $DMAPbI_3$. Measured at 20 T and 20 kHz MAS.

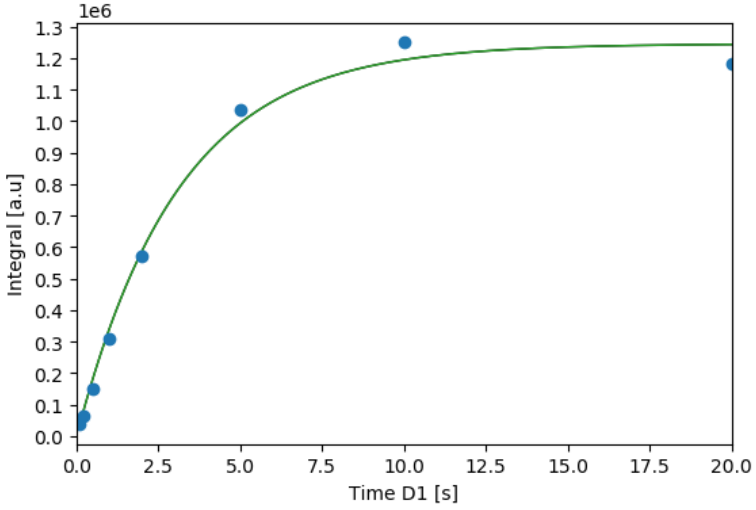

Figure S6: ^{13}C saturation recovery T_1 measurement of $DMAPbI_3$. Measured at 20 T, 80 kHz ^{1}H decoupling, and 20 kHz MAS.

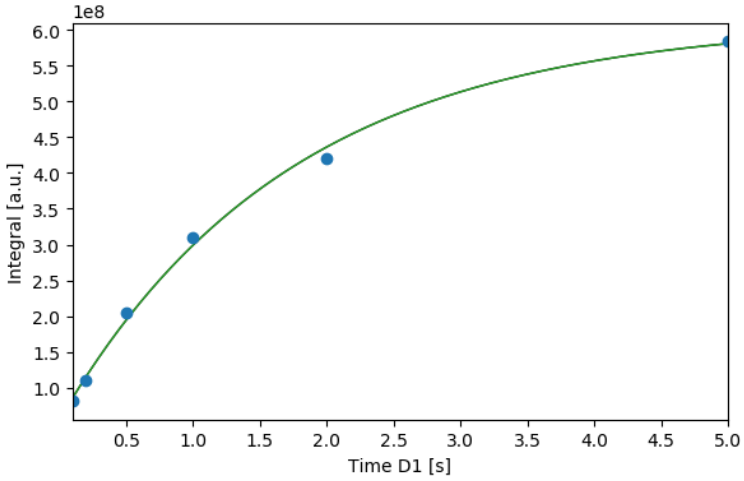

Figure S7: ^{207}Pb saturation recovery T_1 measurement of $DMAPbI_3$. Measured at 20 T and using no MAS (static).

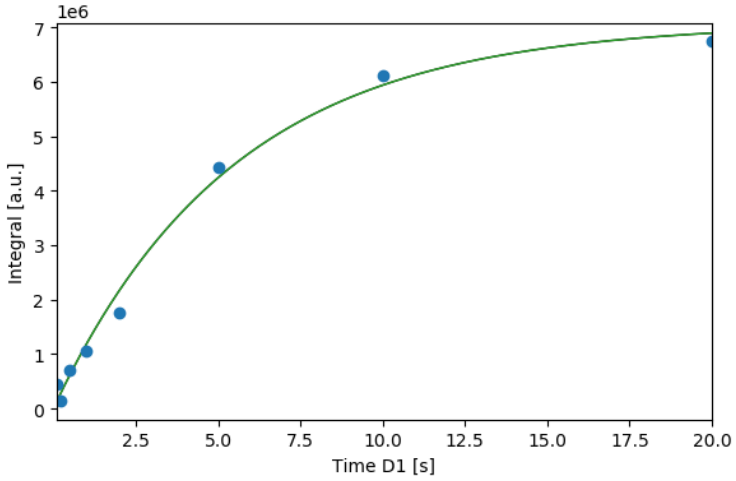

Figure S8: ^{13}C saturation recovery T_1 measurement of DMA in $MAPbI_3$. Measured at 20 T, 80 kHz ^{1}H decoupling, and 17.5 kHz MAS.

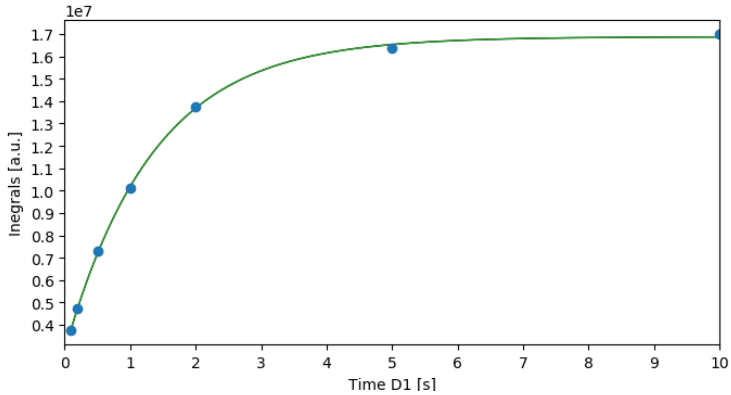

Figure S9: ^{207}Pb saturation recovery T_1 measurement of the 95:5 sample. Measured at 20 T and using no MAS (static).

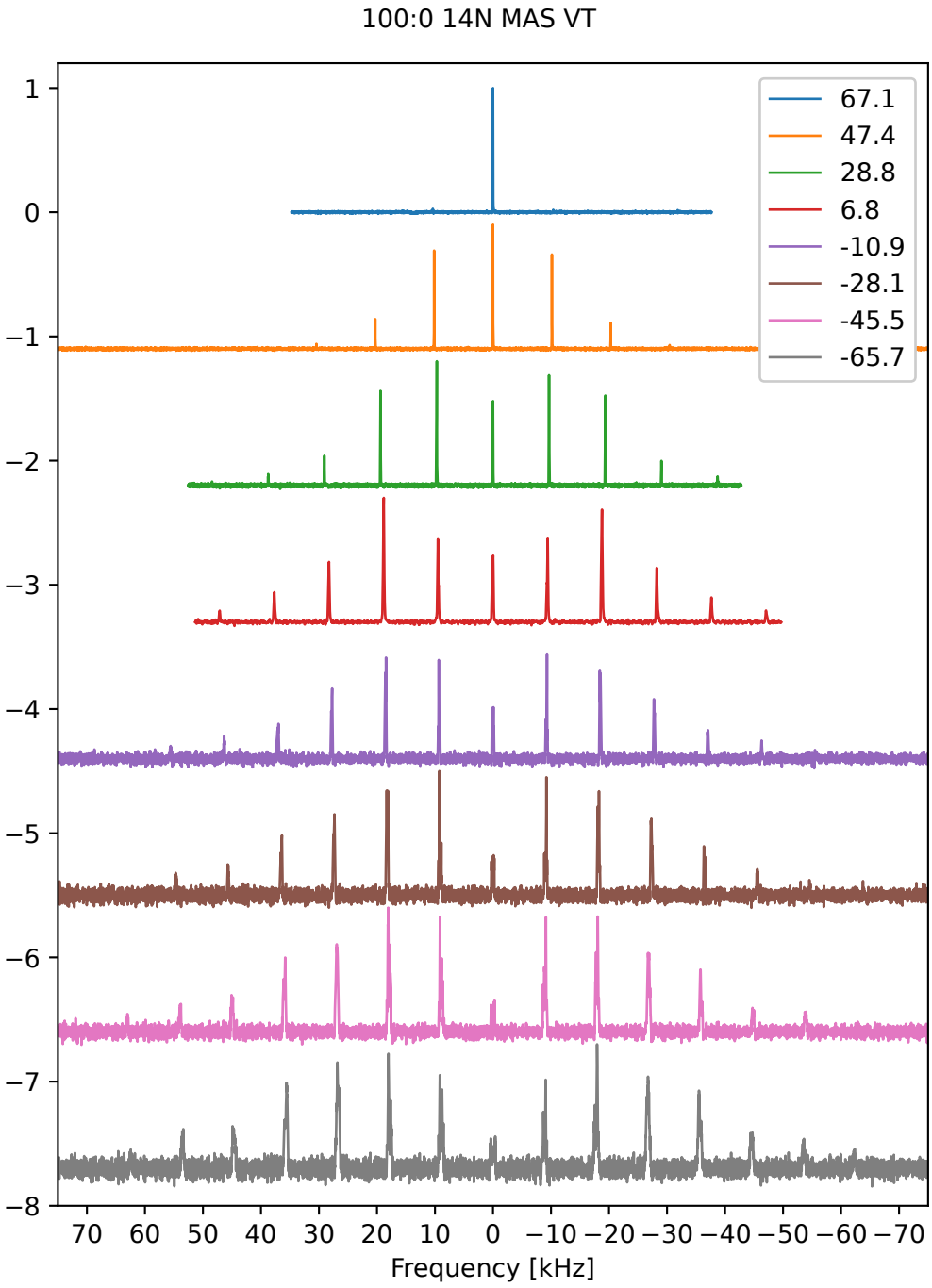

Figure S10: ^{14}N MAS spectra of $MAPbI_3$ (100:0 sample) at various temperatures (°C), measured at 9.4 T and using 9 kHz MAS. The integrals of the sidebands have been fit (assuming $\eta = 0$) to obtain the C_Q as a function of temperature. Based on this value, the FWHM of the static line width has been estimated, using the distance between the maxima of the powder pattern.

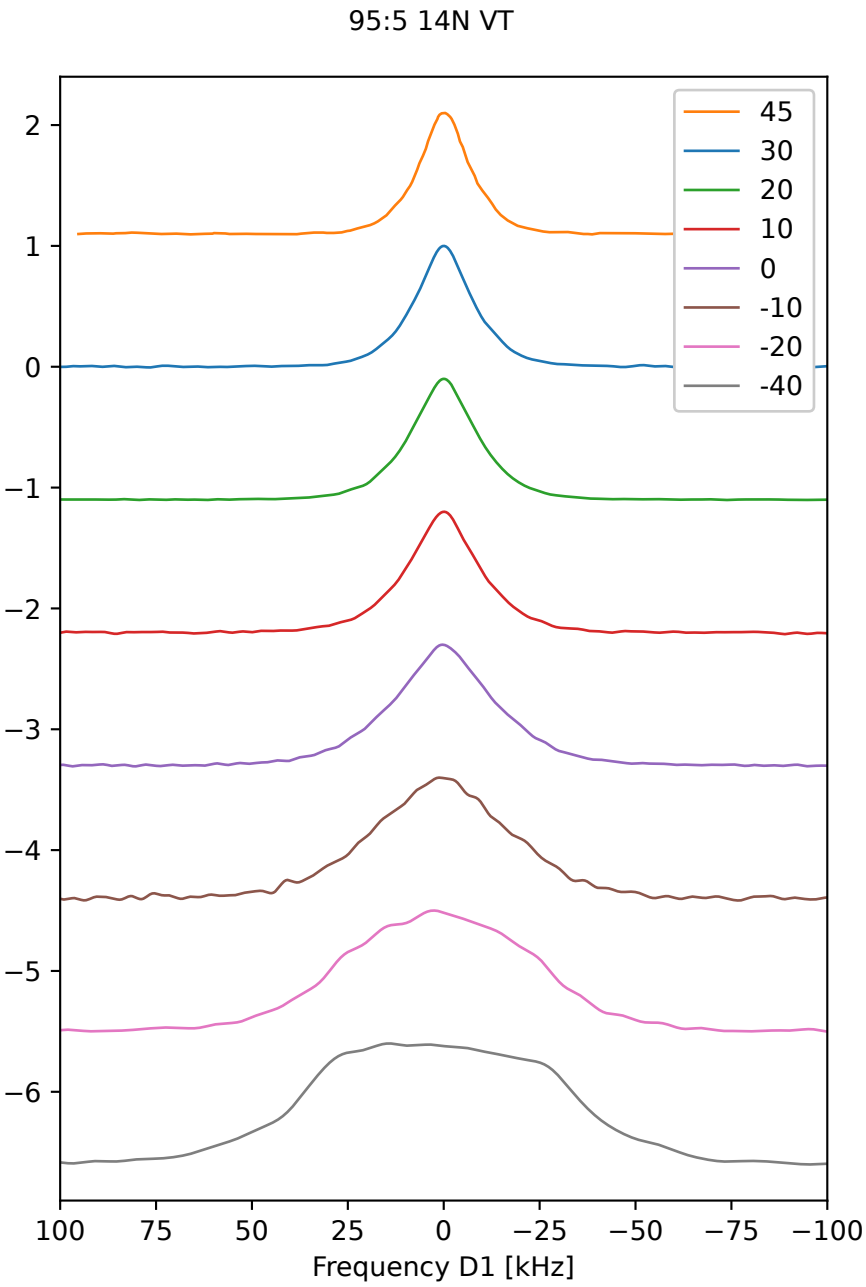

Figure S11: Static ^{14}N spectra of (DMA:MA)PbI_3 (95:5 sample) at various temperatures (°C), measured at 20 T.

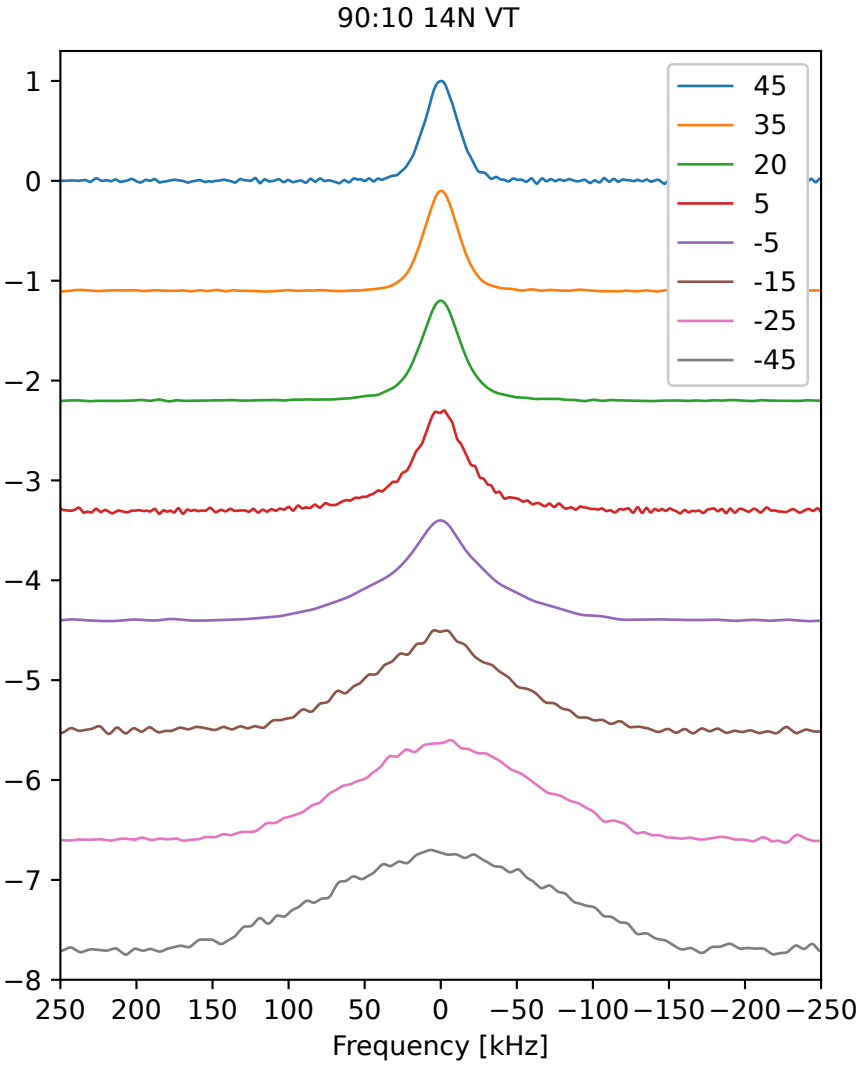

Figure S12: Static ^{14}N spectra of (DMA:MA)PbI_3 (90:10 sample) at various temperatures (°C), measured at 20 T.

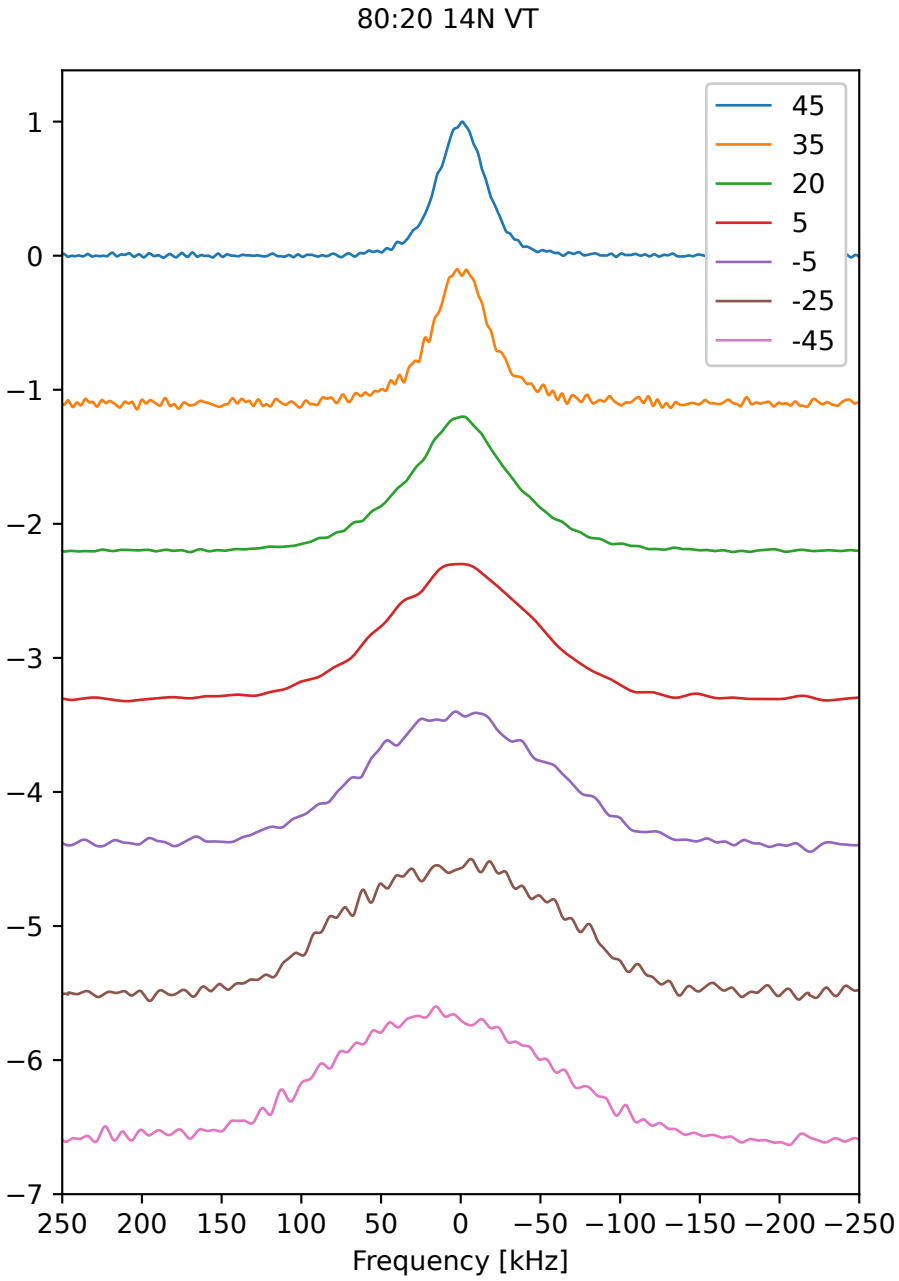

Figure S13: Static ^{14}N spectra of (DMA:MA)PbI$_3$ (80:20 sample) at various temperatures (°C), measured at 20 T.

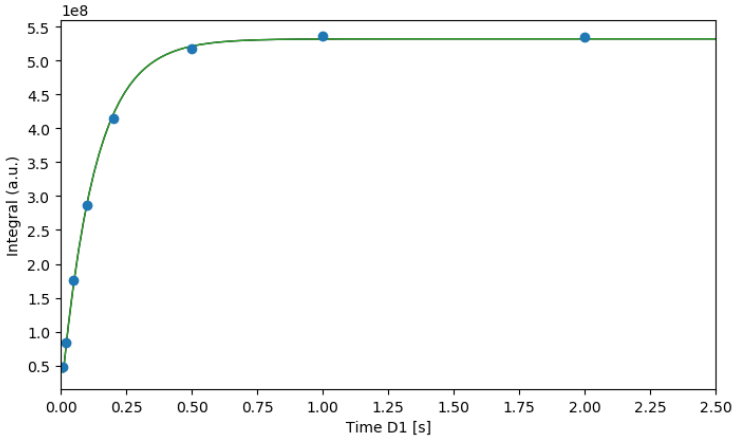

Figure S14: ^{14}N saturation recovery T_1 measurement of the MA cation in the 80:20 sample, used for establishing the reorientation time. The full curve shows the fit.

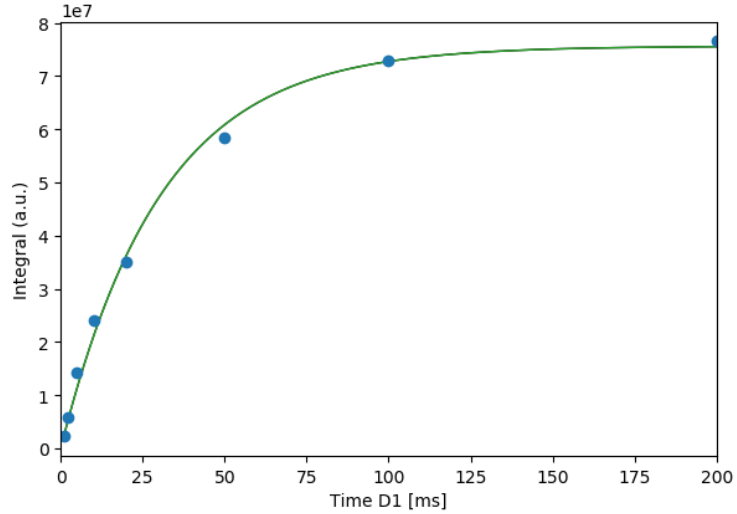

Figure S15: ^{14}N saturation recovery T_1 measurement of the DMA cation in the 80:20 sample, used for establishing the reorientation time. The full curve shows the fit.