

# Supplementary Materials

Structural Phase Transitions and Thermal Degradation Process of MAPbCl<sub>3</sub> Single Crystals  
Studied by Raman and Brillouin Scattering

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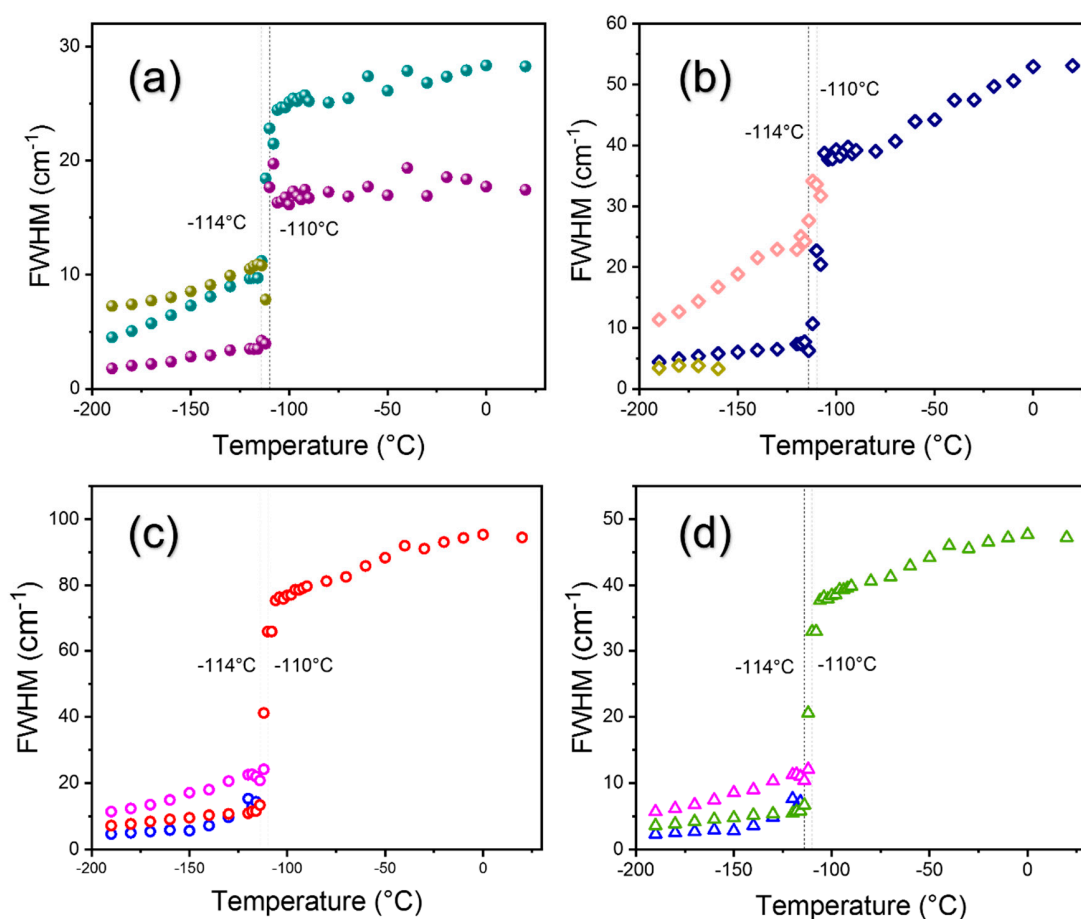


Figure S1: Temperature dependences of the full width at half maximum (FWHM) in 10-300 cm<sup>-1</sup> frequency range (a-d). Phase boundaries are shown as vertical dotted lines along with the phase transition temperatures

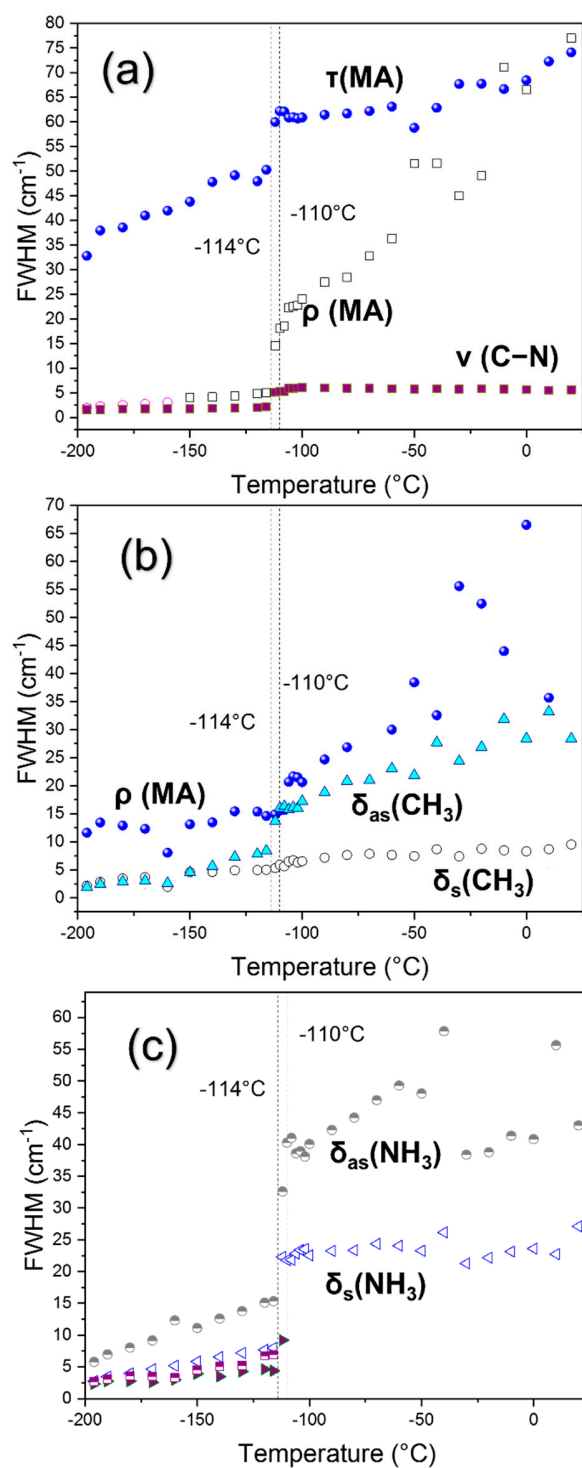


Figure S2: Temperature dependences of the full width at half maximum (FWHM) in  $400\text{-}1700\text{ cm}^{-1}$  frequency range (a-c). Phase boundaries are shown as vertical dotted lines along with the phase transition temperatures.

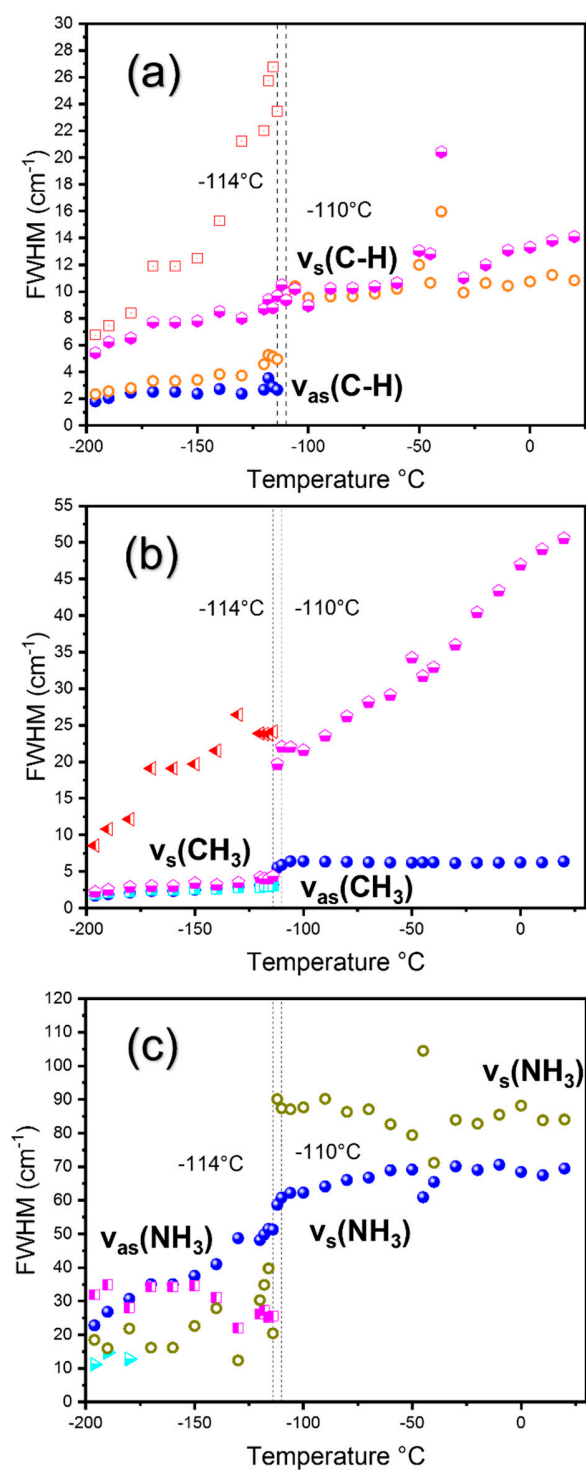


Figure S3: Temperature dependences of the full width at half maximum (FWHM) in 2700-3400  $\text{cm}^{-1}$  frequency range (a-c). Phase boundaries are shown as vertical dotted lines along with the phase transition temperatures.

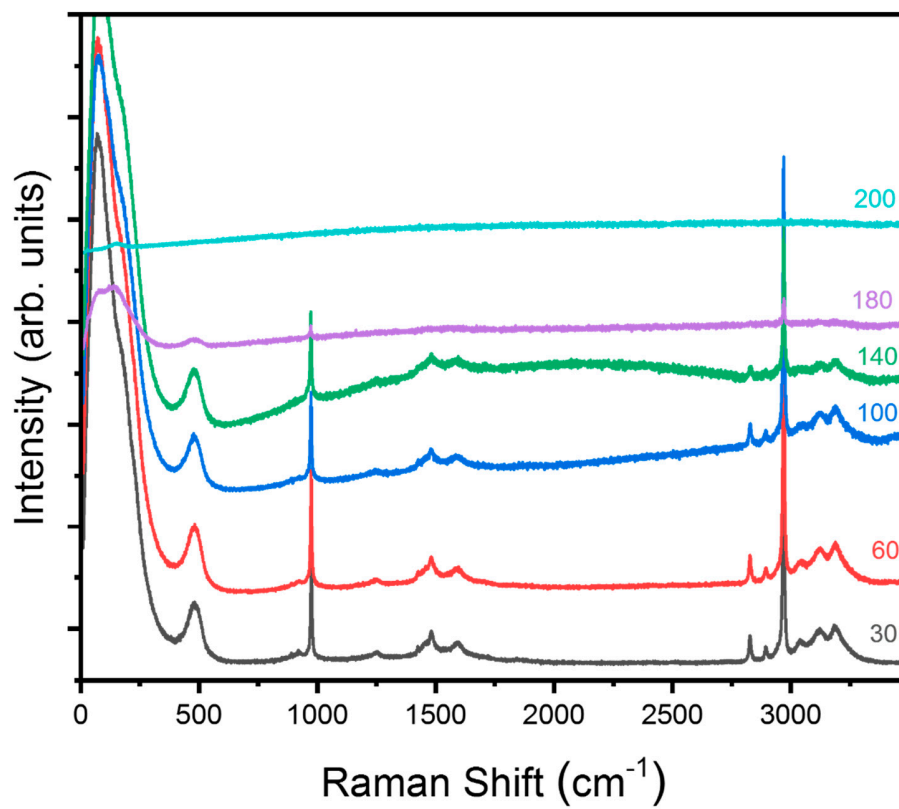


Figure S4: Raman spectra of MAPbCl<sub>3</sub> in a wide frequency range of 10-3500 cm<sup>-1</sup> recorded in the temperature range from room temperature (RT) to 200°C.

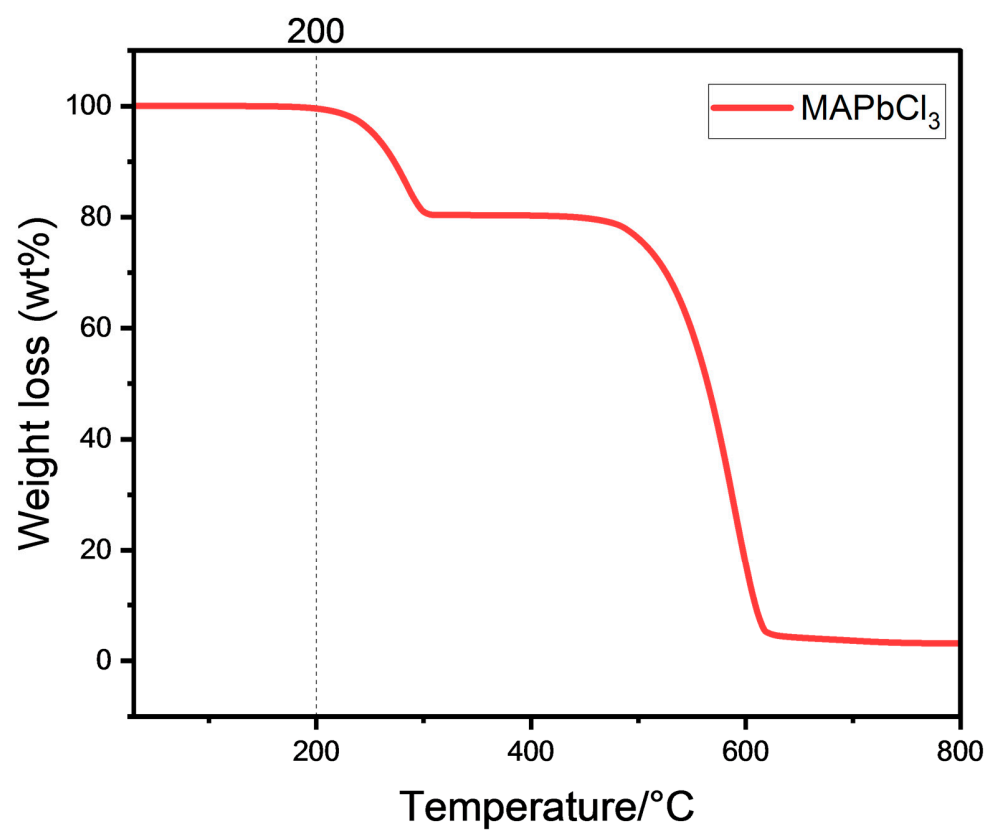


Figure S5. Thermogravimetric analysis curve for synthesized MAPbCl<sub>3</sub> crystal.

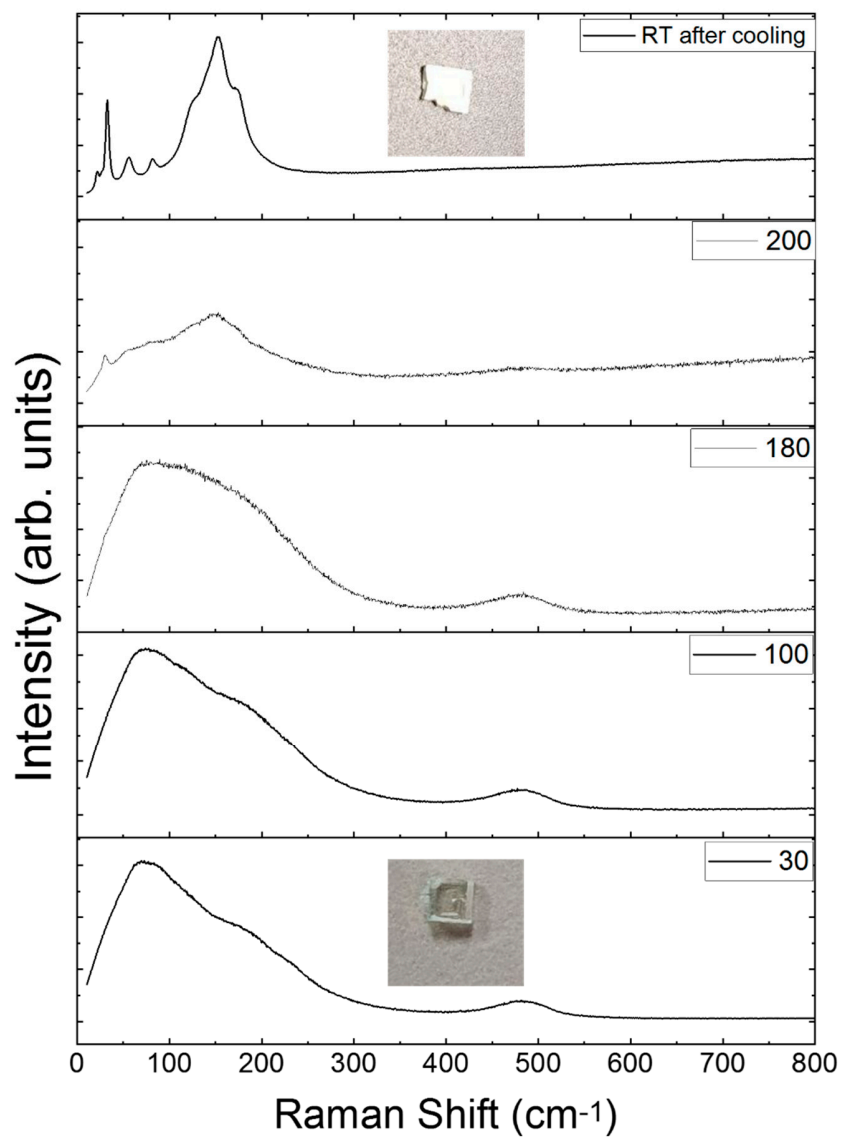


Figure S6: Raman spectra of MAPbCl<sub>3</sub> presented in a limited frequency range of 10-800 cm<sup>-1</sup> from room temperature (RT) to 200°C. Inset figures show the single crystal before (lower figure) and after (upper figure) the degradation.

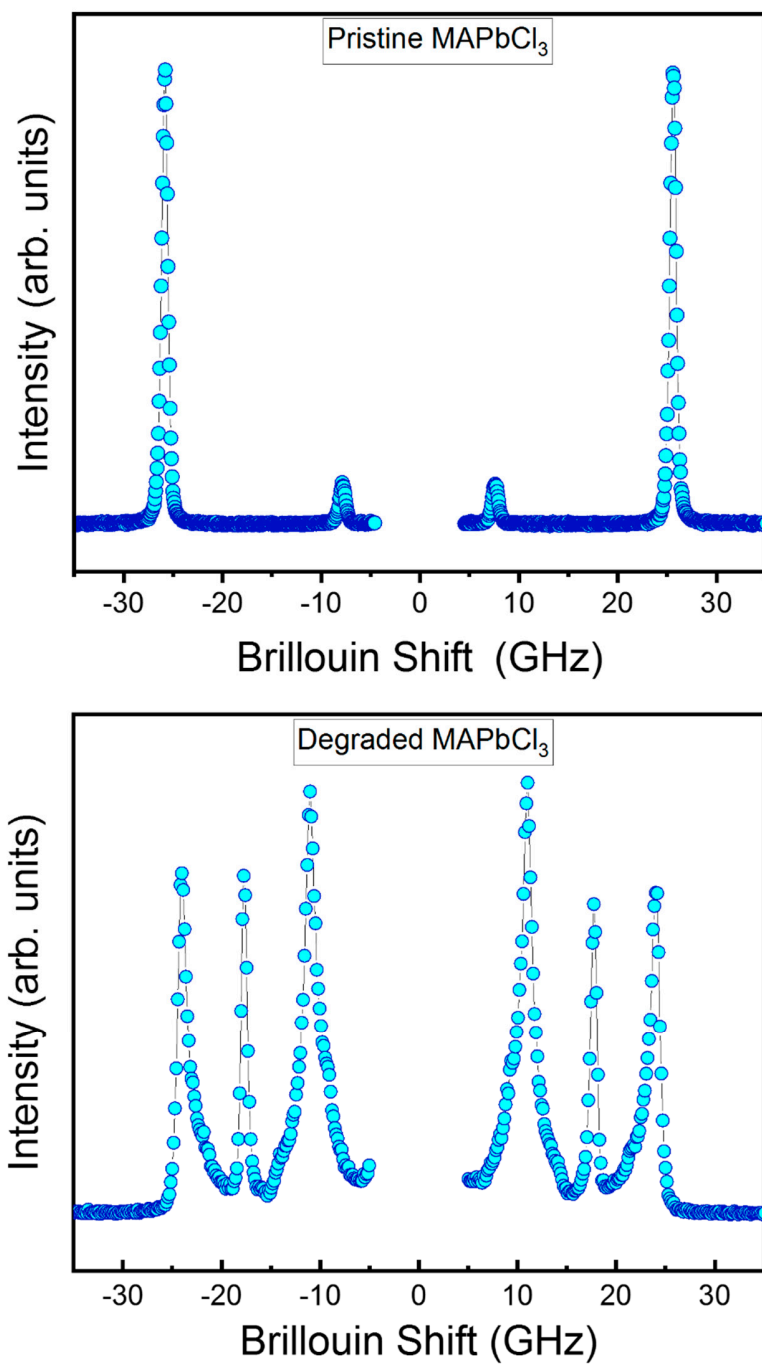


Figure S7: Comparison of Brillouin spectra of the pristine MAPbCl<sub>3</sub> single crystal (a) with the crystal kept for one month in the ambient condition (b)