

Unveiling tetrahedral dynamics in 0-D halide perovskite $\text{Cs}_3\text{Cu}_2\text{I}_5$

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In this experiment, we first investigated the room-temperature phonon spectra of $\text{Cs}_3\text{Cu}_2\text{I}_5$. The (800) Bragg reflection, which has the highest structure factor, was selected as the scattering position. Phonon measurements were carried out along the $[0 -K -K]$ and $[H 0 0]$ reciprocal-space directions. The measured phonon spectra are presented in Fig. 1. After completing the measurements on $\text{Cs}_3\text{Cu}_2\text{I}_5$, we proceeded to investigate the phonon spectra of $\text{Cs}_2\text{AgBiBr}_6$. Measurements were performed along the $[4 -K -K]$, $[H 4 4]$, $[4+H 4 4]$, $[4+H 0 0]$, $[0 4-K 4-K]$, and $[4-H 4-H 4-H]$ reciprocal-space directions at 300, 400, and 500 K. The corresponding phonon spectra are shown in Figs. 2 and 3.

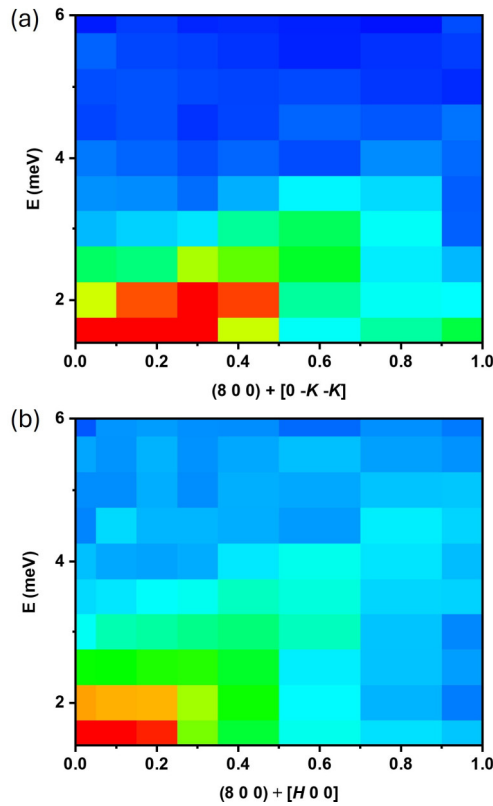


Fig.1 Acoustic phonon dispersion relations of $\text{Cs}_3\text{Cu}_2\text{I}_5$ measured along (a)[8 -K -K] and (b) $[8+H 0 0]$ at 300 K.

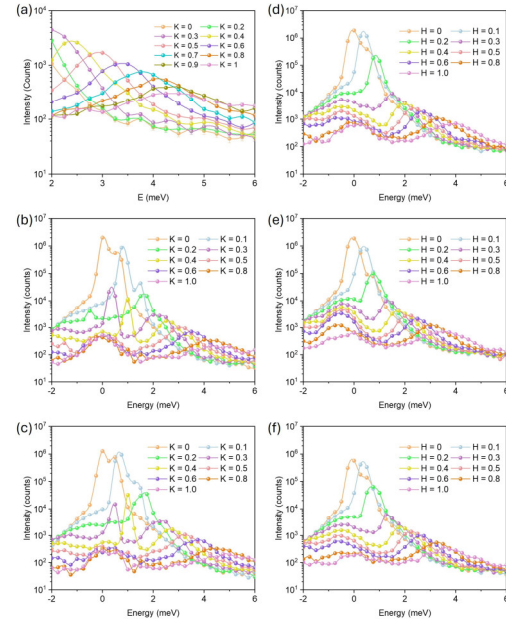


Fig. 2 Phonon spectra of $\text{Cs}_2\text{AgBiBr}_6$ measured along the $[4 -K -K]$ at (a) 300 K (b) 400 K, (c) 500K, and along $[H 4 4]$ at (d) 300 K (e) 400 K, (f) 500K.

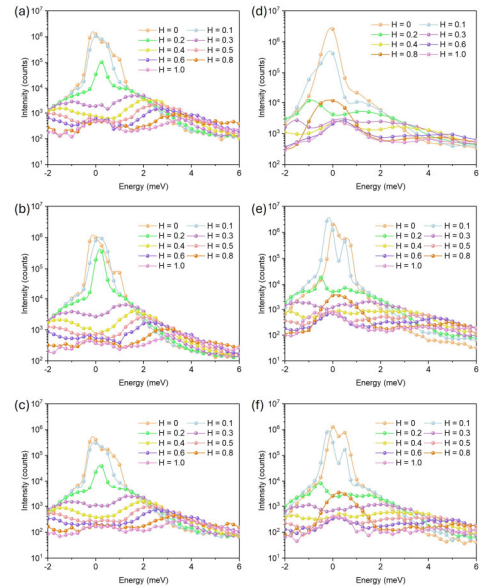


Fig. 3 Phonon spectra of $\text{Cs}_2\text{AgBiBr}_6$ measured along the $[4+H 4 4]$ at (a) 300 K (b) 400 K, (c) 500K, and along $[4+H 0 0]$ at (d) 300 K (e) 400 K, (f) 500K

