Supplementary Information

Unravel the mechanism of temperature modulated exciton binding energy for MAPbBr₃ perovskites

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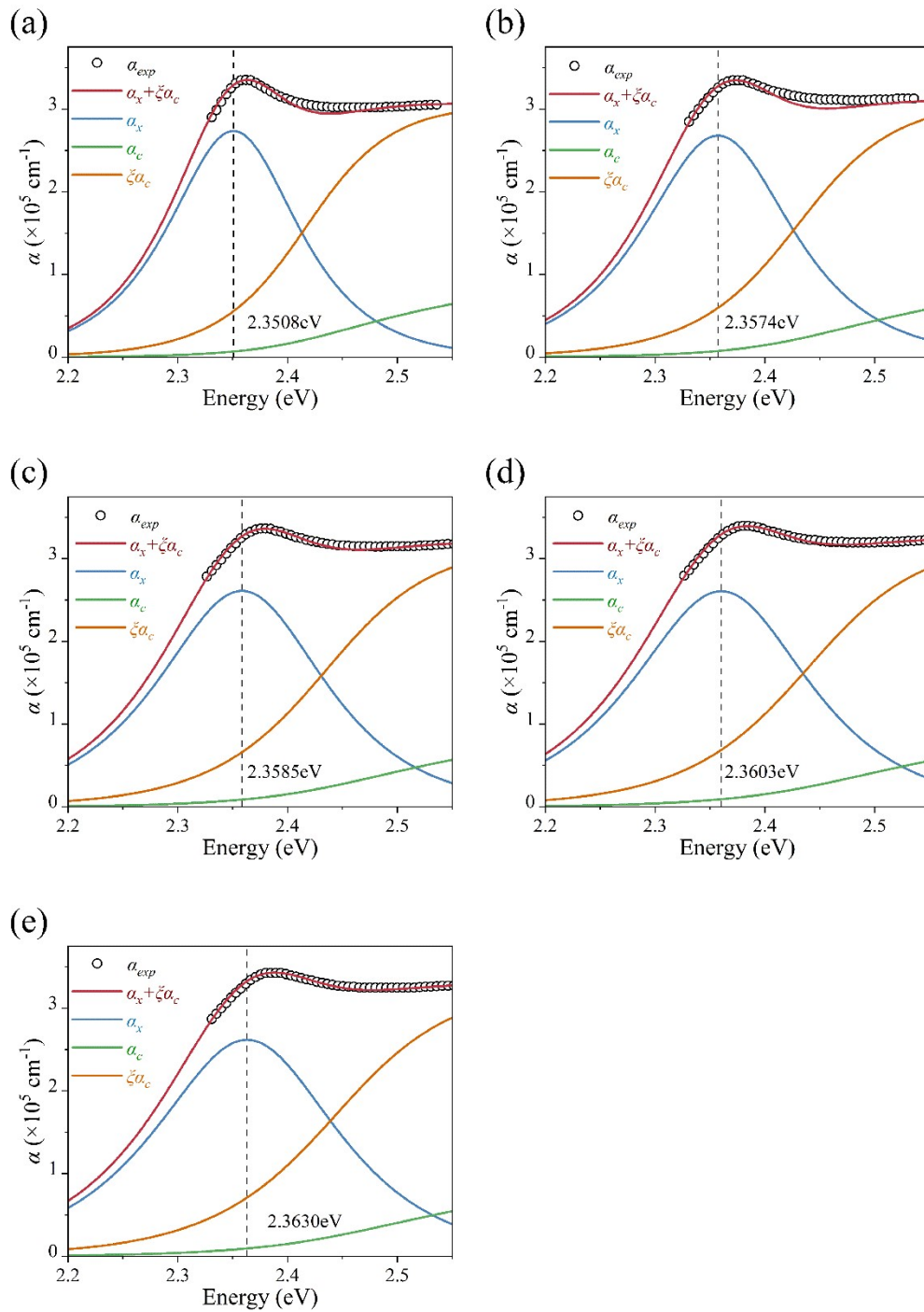
Fig. S1. (a)-(e) are Elliott model fitted absorption spectra of MAPbBr$_3$ in 170 K, 210 K, 230 K, 250 K and 270 K, respectively. The scatter plot represents experimentally obtained absorption coefficients, while the red line depicts absorption coefficients fitted based on the Elliott model. The blue, green, and orange lines represent excitonic absorption, continuum state absorption, and continuum state absorption enhanced by the Sommerfeld factor within the Elliott model, respectively.
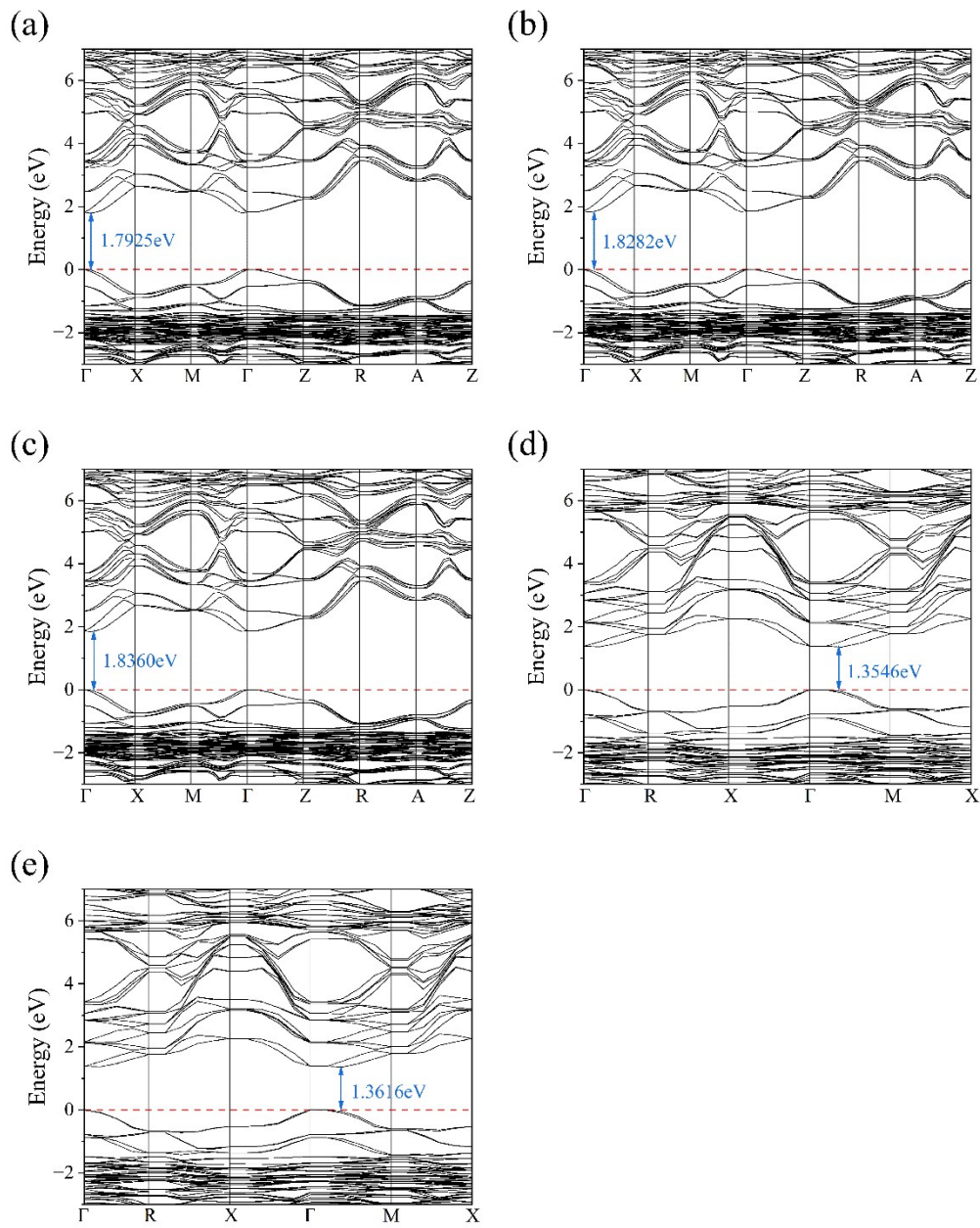
Fig. S2. (a)-(e) are the band structures of MAPbBr$_3$ in 170 K, 210 K, 230 K, 250 K and 270 K, respectively.
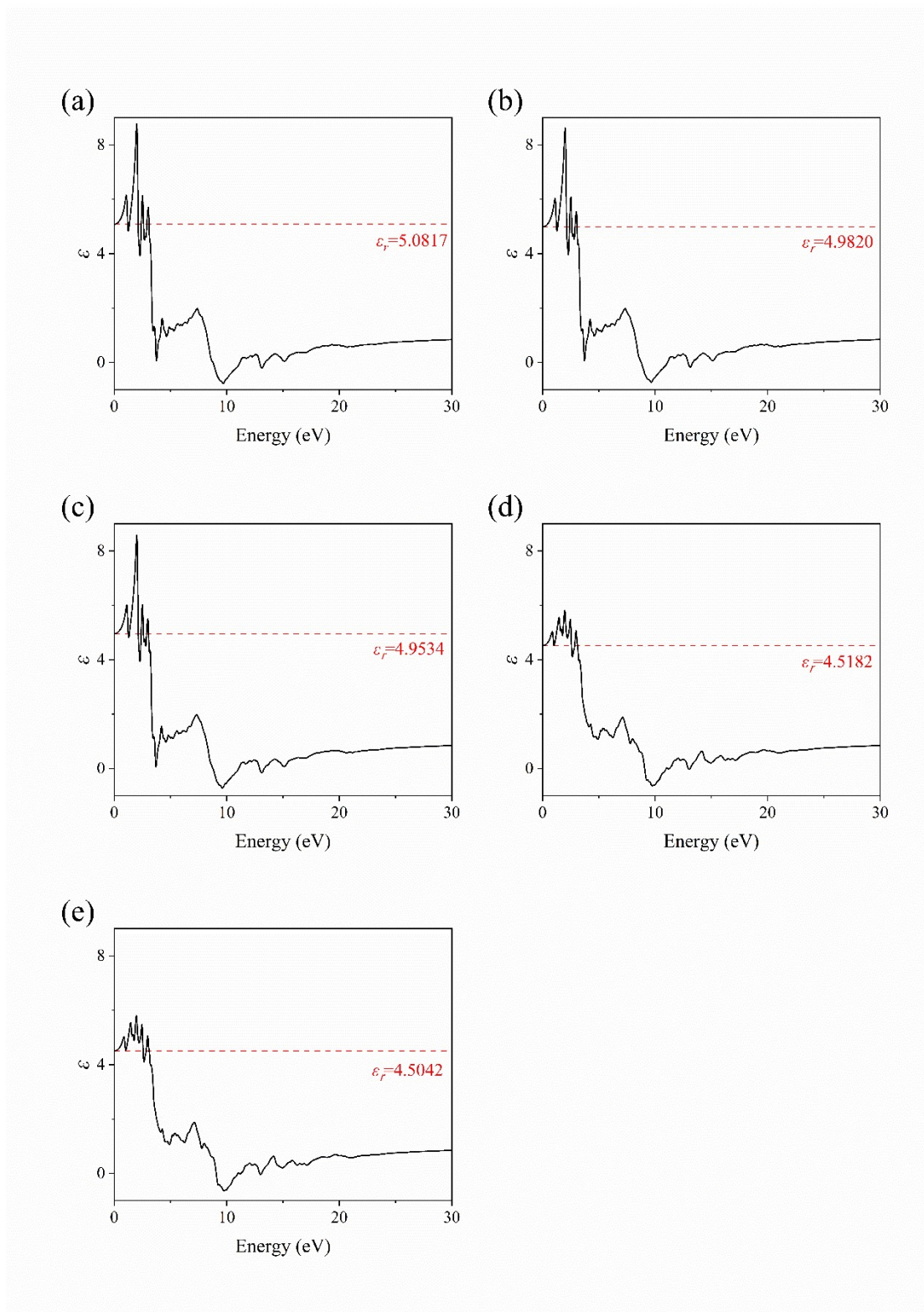
Fig. S3. (a)-(e) are the real part of the dielectric functions of MAPbBr₃ in 170 K, 210 K, 230 K, 250 K and 270 K, respectively. The red dashed lines indicate the relative permittivity.

Table S1: Lattice constants and volumes of MAPbBr$_3$ from 170 K to 290 K with 20 K interval.

T(K)	a(Å)	b(Å)	c(Å)	V(Å^3)
170	8.3996	8.4312	11.8299	837.322
190	8.4201	8.4518	11.8589	843.484
210	8.4407	8.4724	11.8878	849.674
230	8.4613	8.4931	11.9167	855.900
250	11.9091	11.8343	6.0433	851.491
270	11.9173	11.8424	6.0475	853.253
290	11.9255	11.8506	6.0516	855.017