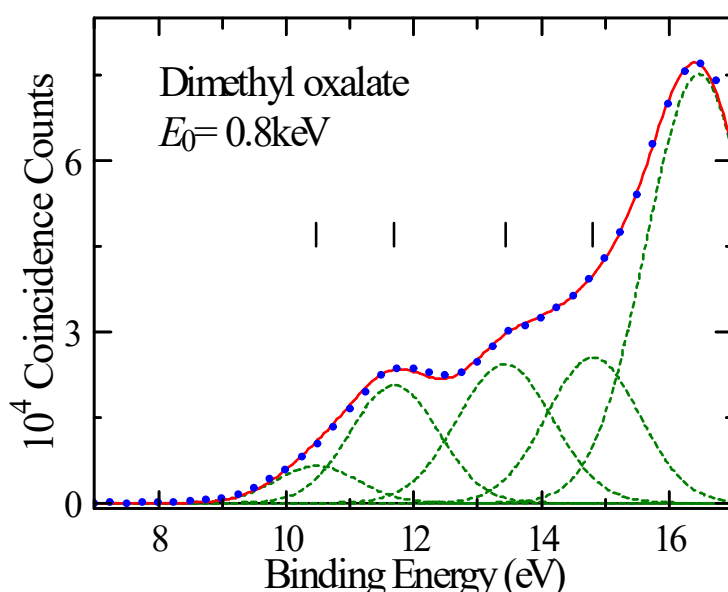


Supplementary information for  
**Molecular conformation of dimethyl oxalate studied by  
electron momentum spectroscopy**

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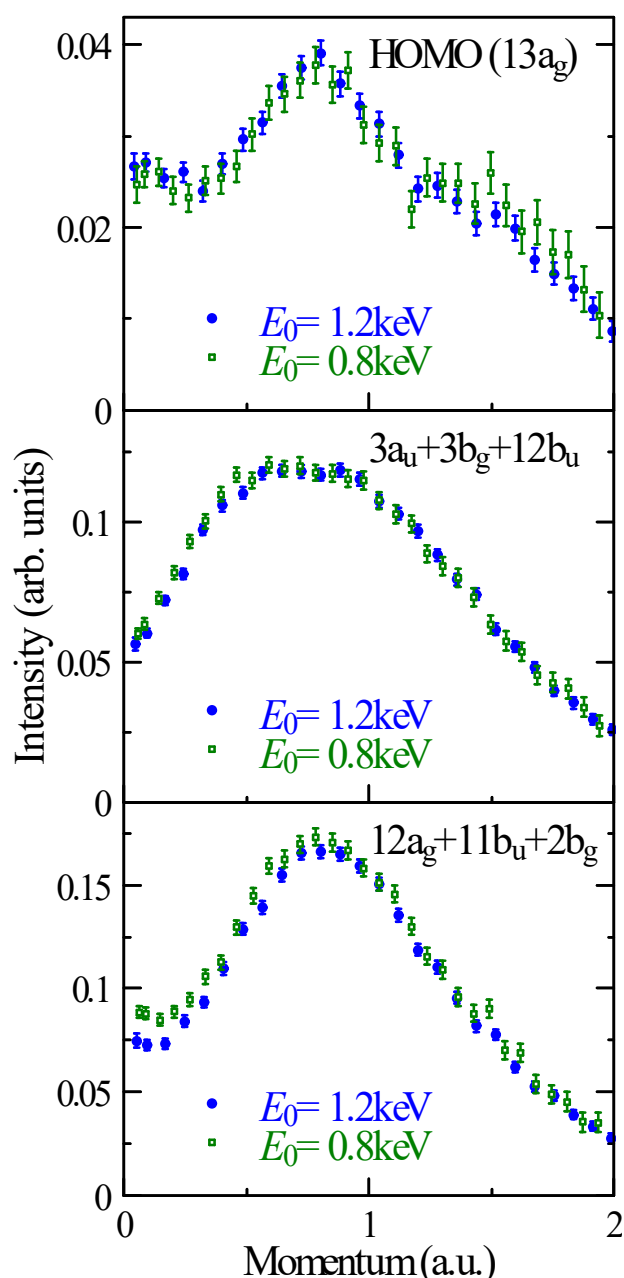
A supplemental experiment was conducted at an incident electron energy of  $E_0 = 0.8$  keV to investigate the  $E_0$  dependence of momentum profiles for dimethyl oxalate. The results of this experiment were then compared with the data obtained at  $E_0 = 1.2$  keV. The experimental conditions were nearly identical to those at  $E_0 = 1.2$  keV, with the exception of the incident electron energy utilized. Figure S1 presents the binding energy spectrum of dimethyl oxalate, which was constructed by plotting the number of electron-electron coincidence counts against the binding energy of the target electron. The energy resolution of the measurement was 1.4 eV full width at half maximum.



**Fig. S1** The binding energy spectrum of dimethyl oxalate measured at  $E_0 = 0.8$  keV. The dashed curves in the figure represent the deconvolution functions, with each curve corresponding to a specific ionization band, and the sum of these functions is depicted by a solid line.

Figure S2 presents a comparison of the experimental momentum profiles measured at two different incident electron energies. The momentum profiles at  $E_0 = 0.8$  and 1.2 keV for the  $13a_g$  orbital are consistent within the error bars, indicating the attainment of the high energy limit. Conversely, the  $\{3a_u$

+  $3b_g + 12b_u$ } momentum profile at  $E_0 = 0.8$  keV has exhibited slightly higher intensity at low momentum compared to that at  $E_0 = 1.2$  keV. A similar trend is observed for the  $\{12a_g + 11b_u + 2b_g\}$  momentum profile. The observation indicates that for the second and third ionization bands, the high energy limit is not reached at  $E_0 = 0.8$  keV, suggesting the potential persistence of the distorted-wave effect even at  $E_0 = 1.2$  keV.



**Fig. S2** Comparison of the experimental momentum profiles measured at two different incident electron energies, 0.8 and 1.2 keV.