

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: In situ POM showing the **I-II heating** transition

File Name: Supplementary Movie 2

Description: In situ POM showing the **II-I cooling** transition

File Name: Supplementary Movie 3

Description: In situ POM showing the **II-III heating** transition

File Name: Supplementary Movie 4

Description: In situ POM showing the **III-II cooling** transition

File Name: Supplementary Movie 5

Description: In situ POM showing the crack formation during the II-I cooling transition

File Name: Supplementary Movie 6

Description: Video showing the thermosalient motion during the I-II heating transition

File Name: Supplementary Movie 7

Description: GIXD video during the I-II heating transition, images taken at 5 second increments

File Name: Supplementary Movie 8

Description: Movie showing the calculated vibrational mode for the quinoidal molecule at 1581 cm^{-1}

File Name: Supplementary Movie 9

Description: Movie showing the calculated vibrational mode for the quinoidal molecule at 1584 cm^{-1}

File Name: Supplementary Movie 10

Description: Movie showing the calculated vibrational mode for the quinoidal molecule at 1636 cm^{-1}

File Name: Supplementary Movie 11

Description: Movie showing the calculated vibrational mode for the quinoidal molecule at 1878 cm^{-1}

File Name: Supplementary Movie 12

Description: Movie showing the calculated vibrational mode for the quinoidal molecule at 1610 cm^{-1}

File Name: Supplementary Movie 13

Description: GIXD video during the II-III heating transition, images taken at 5 second increments

File Name: Supplementary Movie 14

Description: Movie showing the calculated vibrational mode for the aromatic molecule at 1618 cm^{-1}

File Name: Supplementary Movie 15

Description: Movie showing the calculated vibrational mode for the aromatic molecule at 1635 cm^{-1}