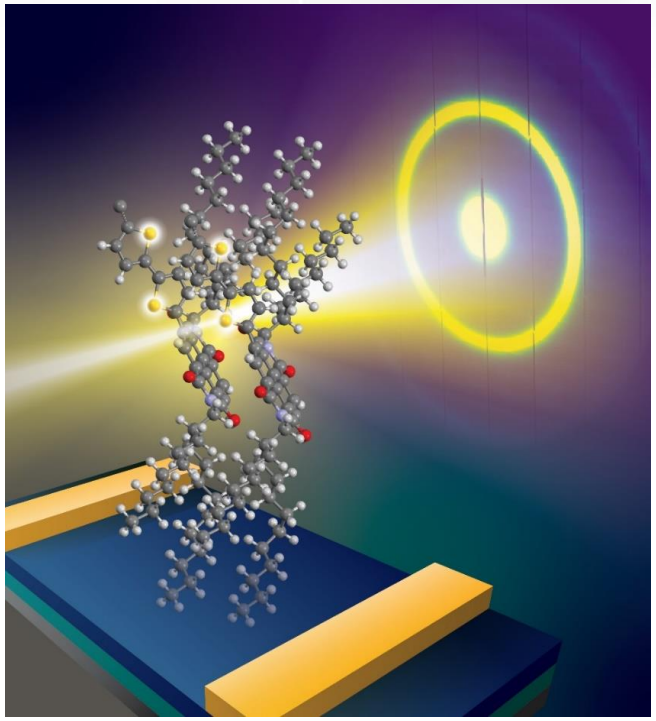
New Way of Revealing Molecular Packing



The image shows X-rays resonating with sulfur atoms in the polymer that gives extra information in the X-ray diffraction pattern.

Scientific Achievement

Scientists demonstrated a new approach using resonant tender x-ray diffraction to reveal the details of the molecular packing in polymers containing sulfur.

Significance and Impact

Polymers are hard to study with x-ray diffraction as they are disordered and interact weakly with x-rays. Tuning the wavelength so that the x-rays resonate with sulfur atoms allows new information about their microstructure to be unlocked, aiding the development of devices based on semiconducting polymers.

Research Details

- Investigated a polymer using resonant tender x-ray diffraction at the SMI beamline at NSLS-II.
- Revealed changes of the resonant diffraction intensity based on polymer packing arrangements.
- Calculated the resonant different polymer packing motifs and compared them with measured diffraction signal to determine the packing in the sample.

G. Freychet, E. Gann, L. Thomsen, X. Jiao, C. R. McNeill. J. Am. Chem. Soc. 143 (3), 1409-1415 (2021).

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