

VISUALIZING CHEMICAL REACTIONS WITH X-RAYS

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S u m m a r y

The recombination of laser-dissociated iodine molecules dissolved in CCl_4 is explored by time-resolved x-ray diffraction. The x-ray pulses employed in our experiments were generated by the ESRF synchrotron in Grenoble. The solvent contribution to the measured signals was eliminated using appropriate experimental procedures. Motions of iodine atoms were then studied from 200 ps to 10 ps. Different relaxation processes are shown to operate in this time domain. It is proved that the iodine recombination follows two reaction paths, taking place in the electronic states X and A/A' of I_2 , respectively. In spite of widely different experimental approaches, laser optical and x-ray studies provide a similar picture of this prototype reaction.