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Ordering of Carbon Tetrachloride confined in slit geometry

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The structure of carbon tetrachloride (CCL4) created by confinement in slit geometry with gap size in the range of few tens of Angstrom is probed by reflectivity and in-plane x-ray measurement. The measurements reveal heterogeneous structures with regions ordered only in z-direction (layered-structure) and periodic order in the plane of the substrates. Current experiments confirm the ability of confinement to induce crystal objects, which was long discussed in literature. The data analysis shows that in the case of CCl4, where the molecule has almost round shape, the spacing of the layered-structure is not close to the molecular size but to the atomic distances in the molecule. The confined films with thickness of 30-40 Å are in strong confined mode and the size of the layered system is smaller than correlation length in bulk. The experimental results suggest that the layered-structure in confinement resemble the short range molecular arrangement as observed in the bulk liquid with differences given by closer packing and modified mutual molecular orientation in confinement.

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