Supporting Information for

Complex supramolecular tessellations with on-surface Self-synthesized C_{60} tiles through van der Waals interaction

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Adsorption site of C_{60} in $(C_{60})_7$ cluster on Au(111) surface

Fig. S1 illustrates how the adsorption sites of the C_{60} molecules within the $(C_{60})_7$ tiles are determined. We use patches of closed-packed C_{60} as the reference. Such closed-packed C_{60} domains can be found next to some tiled regions. Based on previous studies, C_{60} molecules occupy the atop site of Au(111). This allows us to add the locations of Au atoms (grey colored dots in the figure) onto the image. From this, we further determine the location of the C_{60} molecules in each tile.

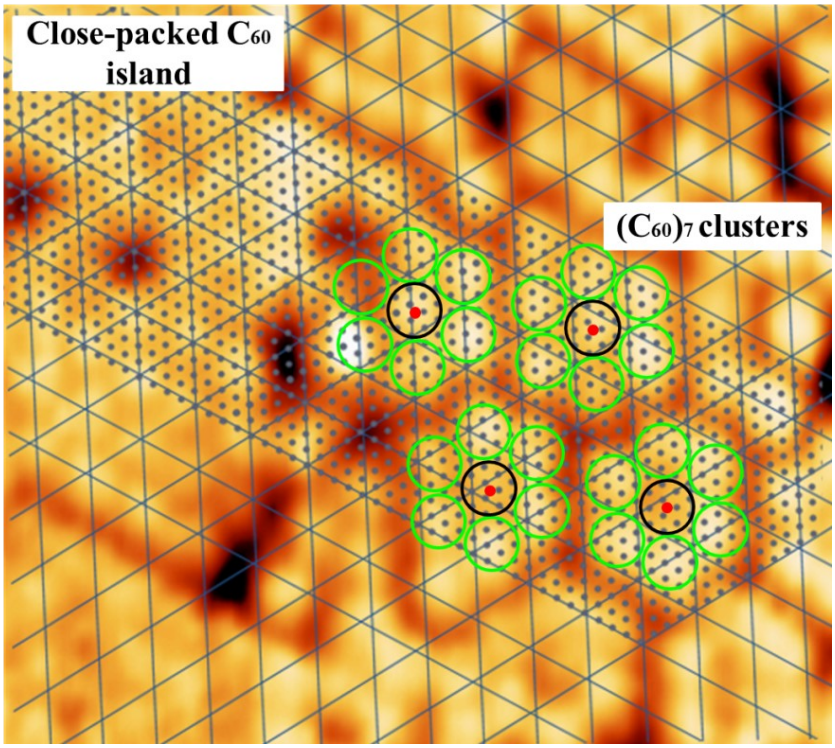

Fig. S1 The adsorption sites of C_{60} molecules in the $(C_{60})_7$ cluster are determined by using the C_{60} in close-packed phase as a reference.

Manipulation of C_{60} molecules by the STM tip

Fig. S2 shows an image of porous C_{60}/OT network. There are two diferent sized pores with the larger of the two big enough to accommodate an extra C_{60} molcule. The pores are filled with OT molecules. In Fig. S2(b), one pore is shown to have been filled with a C_{60} molecule. The pore is slightly too large as shown by the line profile of Fig. 2(d). Hence, the C_{60} molecule sitting inside the pore is unable to interact efectively with neighbourong molecules due to too large a molecule-molecule distanec. The seven C_{60} molecules inside the dotted circle in Fig. S2(b) is not a stable structure at RT. During experiments, we oberve C_{60} moleules constantly moving into and out of such pores.

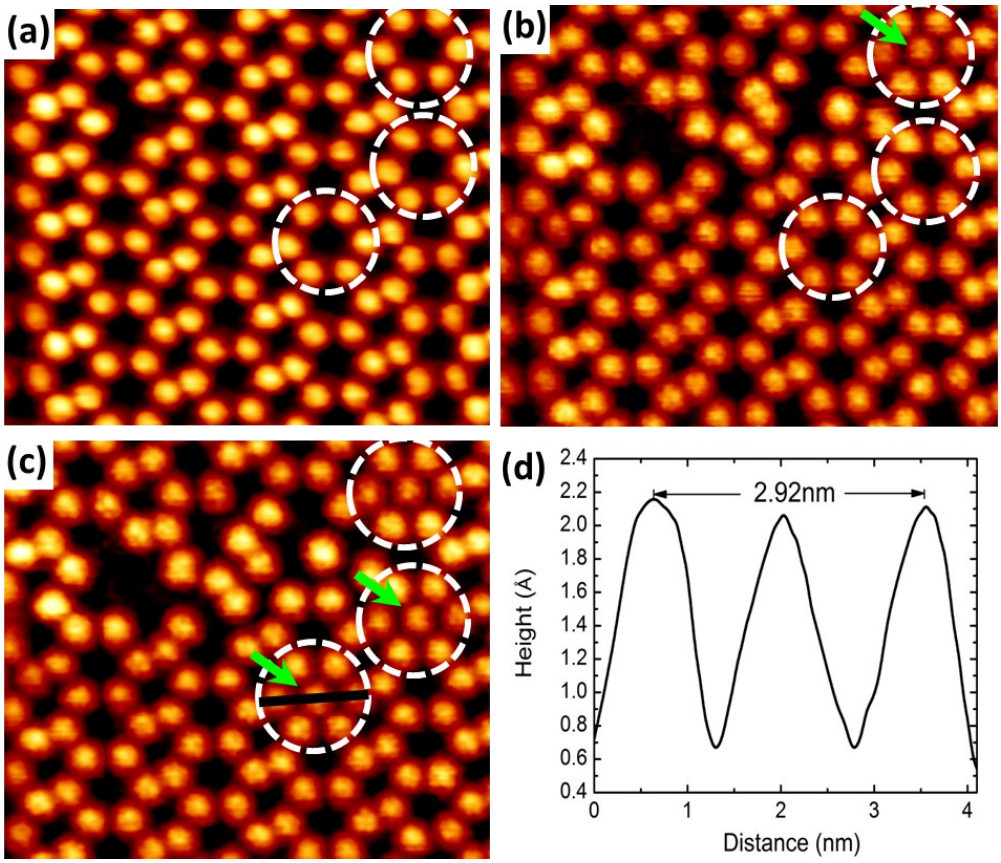

Fig. S2 (a)-(c) A series of STM images demonstrating the molecular manipulation procedure by STM tip. (d) Line profile along the black line in (c). All C_{60} molecules show the same brightness appearance with a lateral distance of ~1.46 nm between neighboring C_{60} molecules.

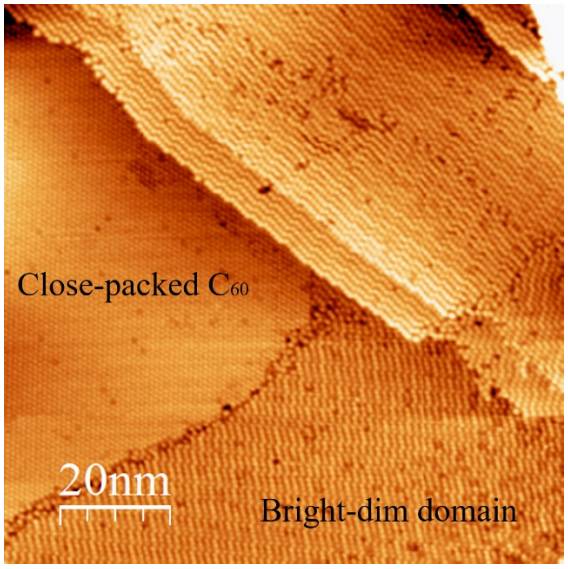

Fig. S3 A large-scale STM image showing the extended structure consisting of nanochains. C_{60} molecules in nanochains are arranged in alternating patterns of bright and dim.

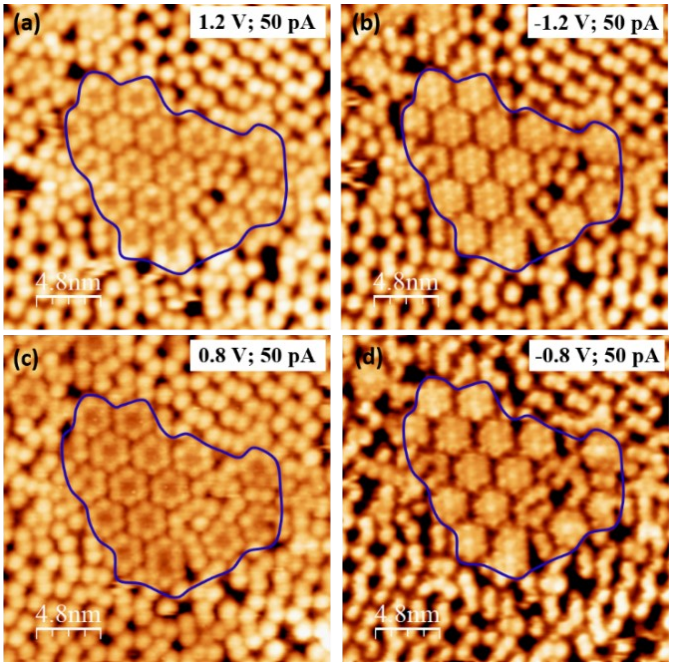

Fig. S4 Bias-dependent STM images. The central and surrounding molecules in the C_{60} heptamer unit inside the blue enlosure show different biase-sependent bahavior.

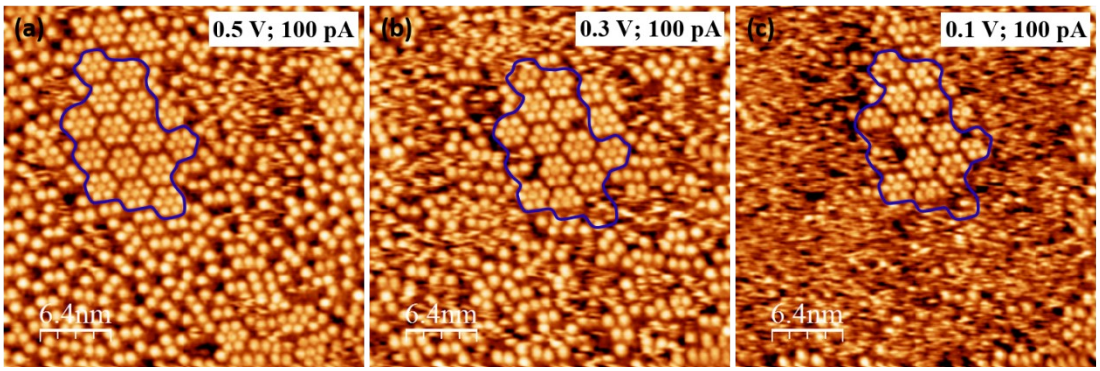

Fig. S5 STM images with decreasing sample bias under the constant-current mode. The domain inside the blue line exhibits higher stability than the surrounding areas.