Magic C_{60} islands forming due to moiré interference between islands and substrate

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Magic C_{60} islands forming due to moiré interference between islands and substrate

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Abstract

Recently proposed mechanism for self-organized formation of magic islands [Nat.Comm. 4(2013)1679] has received a new experimental confirmation. According to this mechanism, self-assembly is mediated by the moiré interference between an island and underlying substrate lattice. It was first detected at C_{60} island growth on In-adsorbed Si(111)$\sqrt{3}\times\sqrt{3}$-Au surface. Changing In adsorbate for Tl results in lowering the corrugations of the surface potential relief due to a greater surface metallization. This allows formation of the C_{60} arrays with novel moiré pattern. As a result, a new set of magic C_{60} islands is formed on Tl-adsorbed Au/Si(111) surface differing from that observed on In-adsorbed surface. For example, the 19-C_{60} magic island which has a non-compact boomerang shape on In-adsorbed Au/Si(111) surfaces adopts a shape of regular hexagon on Tl-adsorbed surface.

Keywords:
Atom–solid interactions, Silicon, Fullerene, Self–assembly, Scanning tunneling microscopy
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