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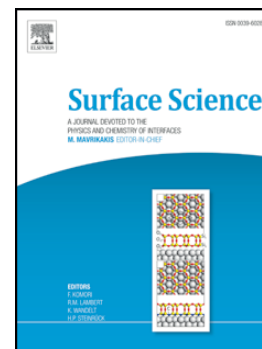
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D.A. Olyanich, V. Mararov, T.V. Utas, O.A. Utas, D.V. Gruznev, A.V. Zotov, A.A. Saranin

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Magic C₆₀ islands forming due to moiré interference between islands and substrate

D.A. Olyanich^{a,b}, V. Mararov^a, T.V. Utas^{a,b}, O.A. Utas^{a,b},
D.V. Gruznev^{a,b}, A. V. Zotov^{a,b,c}, A. A. Saranin^{a,b,*}

^a*Institute of Automation and Control Processes, 5 Radio Street, 690041 Vladivostok,
Russia*

^b*School of Natural Sciences, Far Eastern Federal University, 690950 Vladivostok, Russia*

^c*Department of Electronics, Vladivostok State University of Economics and Service,
690600 Vladivostok, Russia*

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 C₆₀ 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 C₆₀ arrays with novel moiré pattern. As a result, a new set of magic C₆₀ islands is formed on Tl-adsorbed Au/Si(111) surface differing from that observed on In-adsorbed surface. For example, the 19-C₆₀ 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

PACS: 68.43.Hn, 68.37.Ef, 68.43.Bc

*Corresponding author

Email address: saranin@iacp.dvo.ru (A. A. Saranin)

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