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Two-dimensional magic Ag nanopucks on Pb quantum islands[1]
Y.P. CHIU, L.W. HUANG, Institute of Physics, Academia Sinica, Taipei, Taiwan, ROC, C.M. WEI, Institute of Physics, Academia Sinica, Taipei, Taiwan, ROC and Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei106, Taiwan, ROC, C.S. CHANG, TIEN T. TSONG, Institute of Physics, Academia Sinica, Taipei, Taiwan, ROC — Periodic patterns of electronic origin found on Pb quantum islands can be employed as the templates to grow self-organized nanopucks of various materials. Owing to a strong interaction existing between Ag and the template, nearly perfect two-dimensional arrays of Ag nanopucks can be grown from 70 K to 150K. Not only is the notable site-selected feature of Ag nanopucks observed on Pb islands but their size distribution also registers a remarkable abundance variation. Those nanopucks with significantly enhanced intensity are denoted as two dimensional magic Ag nanoclusters. Detailed calculations based on *ab initio* density functional theory have been made to illuminate how the size and shape effects related to electronic confinement influence the formation of two-dimensional metal nanostructures. Furthermore, when the Ag nanopuck grows to a certain size, the geometrical effect takes hold from the electronic effect as the major attribute, which drive the Ag nanopucks towards well defined hexagonal crystalline structures.

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