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Confined self-organization of a lattice of surface magic-cluster and its structure determination HSUAN-HAO CHANG, MING-YU LAI, YUH-LIN WANG, CHING-MING WEI, INSTITUTE OF ATOMIC AND MOLECULAR SCIENCES COLLABORATION, DEPARTMENT OF PHYSICS, NATIONAL TAIWAN UNIVERSITY COLLABORATION — The ability to create an ensemble of nanostructures with specific size, shape, and arrangement on particular positions in space is one of the most important issue in the exploration nanoscience and realization nanotechnology. We have been exploring methods to set an initial structure of a substrate surface, which provides desirable constrains to self-organization process and lead to the formation of arrays of nanostructures with identical size and structure. A two dimensional lattice of Ga surface-magic-clusters (SMC), i. e. clusters exhibiting enhanced stability at certain sizes on a particular surface, has created by using the Si(111)-7x7 surface as a confining template. The structure of the individual SMC is determined by a combination of STM, density-functional calculations, and dynamic low energy electron diffraction. The diffraction method is applicable because the SMCs have identical size/structure and form an ordered array with the exact translational symmetry. The unprecedented detailed structure information provided by the diffraction measurement is consistent with direct microscopic imaging and theoretical calculations.

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