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Direct visualization of reversible dynamics in a Si_6 magic cluster in a graphene pore[1] JAEKWANG LEE, Oak Ridge National Laboratory, WU ZHOU, Vanderbilt University, STEPHEN PENNYCOOK, JUAN-CARLOS IDROBO, Oak Ridge National Laboratory, SOKRATES PANTELIDES, Vanderbilt University — Clusters containing only a handful of atoms have been the subject of extensive theoretical and experimental studies, but direct imaging of their structure and dynamics has not been possible so far, with information provided mainly by theory. We report a direct atomically-resolved observation of a single Si_6 magic cluster trapped in a graphene nanopore. We report a sequence of images that show a reversible, oscillatory, conformational change: one of the Si atoms jumps back and forth between two different positions. Density functional theory shows that the cluster is exploring metastable configurations under the influence of the beam providing direct information on the atomic-scale energy landscape. The capture of a magic cluster in a graphene nanopore suggests the possibility of patterning nanopores and either capturing or assembling atomic clusters with a potential for applications.

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