Anchoring of Single Indium Atoms and Few-Atom Indium Clusters onto Graphene *via* Silicon Heteroatoms

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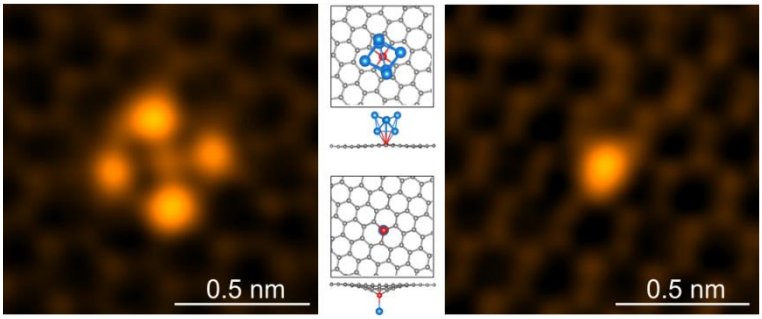
Single atoms and few-atom nanoclusters are of high interest in catalysis and plasmonics, but pathways for their fabrication and placement remain scarce.[1] We report here the self-assembly of room-temperature-stable single indium (In) atoms and few-atom In clusters (2-6 atoms) that are anchored to substitutional silicon (Si) impurity atoms in suspended monolayer graphene membranes.[2] Using atomically resolved scanning transmission electron microscopy (STEM), we find that the symmetry of the In structures is critically determined by the 3- or 4-fold coordination of the Si "anchors". All structures are produced without electron-beam induced materials modification. In turn, when activated by electron beam irradiation in the STEM, we observe *in situ* the formation, restructuring and translation of the Si-anchored In structures. Our results on In-Si-graphene provide a materials system for controlled self-assembly and heteroatomic anchoring of single atoms and few-atom nanoclusters on graphene.



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