

Abstract

Self-assembled chains composed of group III and IV metals on Si(100) are studied for possible applications in nanodevices using Scanning Tunneling Microscopy. In this thesis we experimentally identify the structure of indium chains and analyze their creation and decay. The chains are found to be single atom wide and grow and decay by attachment/detachment of single atoms. The chains are found to preferably nucleate on C-type defects (dissociated H₂O molecules). Diffusion of the In adatoms is almost isotropic, despite the anisotropic structure of the surface. Low temperature experiments show first-ever observation of a free single group III metal on the Si(100)-2×1 surface.