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Boron-Induced Reconstructions of Si(001) Investigated by Scanning Tunneling Microscopy

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Abstract: The local geometric and electronic structures of boron-induced reconstructions produced by thermal decomposition of **diborane** and decaborane on Si(001) has been investigated using scanning tunneling microscopy. STM images show that boron induces several related reconstructions, arising from ordered arrangements of simple structural subunits. These boron-induced atomic rearrangements order even at very low boron exposures, leading to a striking spatial segregation of boron on the surface. Similar reconstructions are observed using **diborane** and decaborane as boron precursors. Annealing at 1000 Kelvin for 90 seconds substantially improves the surface ordering, without significant diffusion of boron from the surface to the bulk.

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