

ATTOMOL CHEMISTRY AND NANOFABRICATION BY ATOMIC FORCE MICROSCOPY

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Here we describe our activity in the development of the local chemical nanolithography when this is performed with the AFM tip several nanometers above the sample surface. This requires the use of a dynamic AFM tip and its operation the low amplitude solution or non-contact mode [1]. The local chemical modification is mediated by the formation of a field-induced liquid bridge. Once a liquid bridge is formed, its length and neck diameter can be modified by changing the tip-sample separation [2]. The liquid bridge provides the ionic species and the spatial confinement to modify a Si(100) surface. The small number of active ionic species within the bridge, a few attomoles allows a very precise control of the lateral and vertical size of the motive. Different chemical reactions such as oxidation or formation of carbides can be accomplished [3].

Several applications of local chemical modification in the fabrication of nanometer-scale devices will be presented [3], such as: (i) arrays of 5000 dots with a periodicity of 40 nm and an average width of 10 nm, (ii) masks for template growth of organic molecules, (iii) silicon wires and (iv) single electron transistors.

Referencias:

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