

The work is focused on studying of a single silver adatom hopping inside a half unit cell of Si(111)- 7×7 reconstruction. It is possible to estimate activation energies and frequency prefactors for hops between particular adsorption sites. It was necessary to make fundamental modifications on a low temperature STM as a part of the work. The modifications have been made on top of a sample cooling system and on inertial motor for coarse approach of the sample to a tip. The vacuum properties of the STM chamber have been improved. A considerable progress in technology of electrochemically etched tungsten tip preparation has been achieved. Further treatment of the tips has been studied with accent on field emission effect on the tip apex. The 7×7 reconstruction could not be prepared inside the vacuum chamber. Reason is probably a poor degassing of the sample. Further planned experiments could not be performed so far. This thesis contains detailed theoretical analysis of the studying of adsorption sites. The tests of time dependent tunnelling spectroscopy method are described in results.