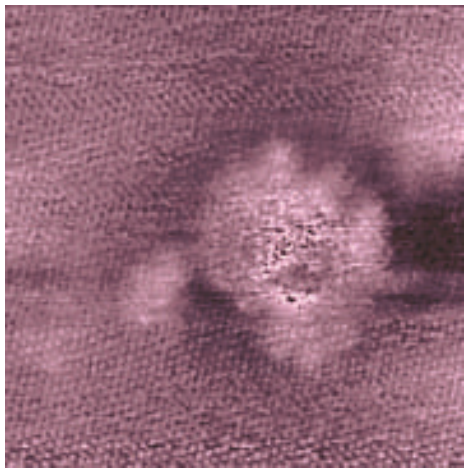
Defects in MoS_2 crystals

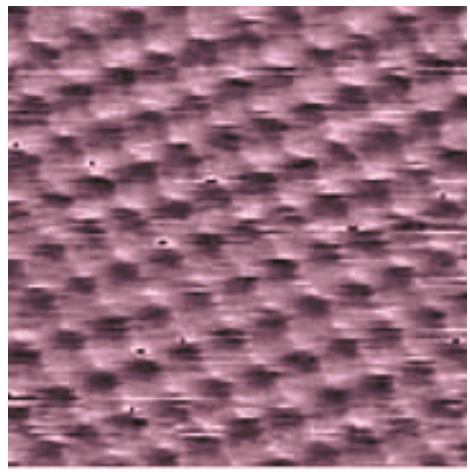
Nanosurf® STM Application Note

Natural MoS2 crystals were cleaved prior to the STM experiment. The measurements have been carried out under ambient conditions. Typical tunneling parameters were 1.6nA tunneling current and 0.35V gap voltage.

STM measurements on MoS2 (raw data)



scan size: 14 nm



scan size: 3 nm

Some nanometre sized inclusions were found within the atomically resolved crystal lattice.

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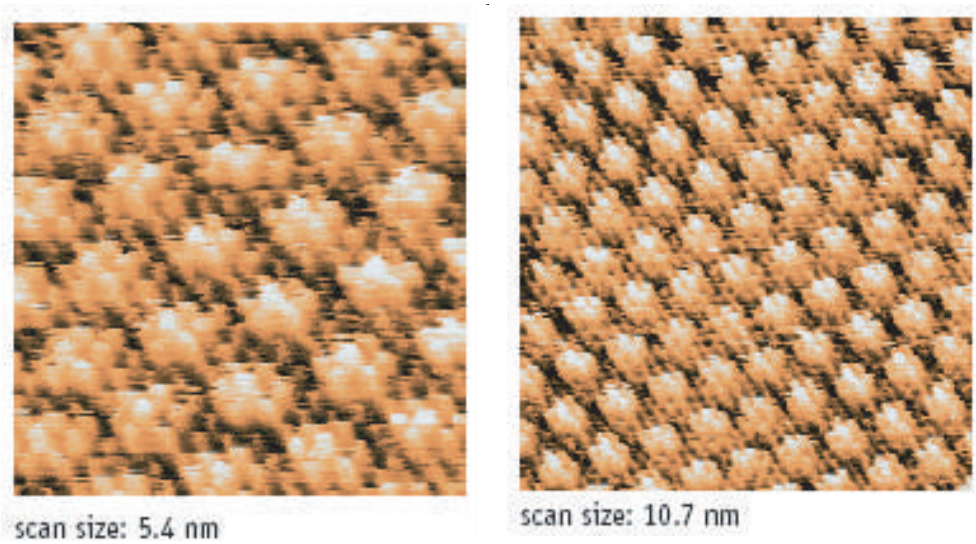
Charge Density Waves observed on TaS_2

Nanosurf® STM Application Note

TaS_2 (and $TaSe_2$) exhibit an electronic phase transition from a normal into a condensed state which is called the Charge Density Wave (CDW) state [1]. The transition is caused by an electron-phonon coupling. STM images of TaS_2 show a triangular atomic lattice (a_0=0.33 nm) with a superimposed CDW lattice of about 3.5 a_0.



scan size: 5.4 nm

scan size: 10.7 nm

To observe CDW typical tunnelling parameters of 2-3 nA and 10-20 mV gap voltage were observed. The atomic lattice can be seen simultaneously when the current is increased to higher values (30 – 40 nA).

[1] R. Wiesendanger et al. p.161ff, Scanning Tunneling Microscopy I, Springer 1992

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