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To whom it may concern,

Hereby I review the thesis "Adsorption of Metal Atoms and Growth of Metal Nanostructures on Silicon Surface - STM Study", written by Mgr. Michael Alexandridis. I would like to offer my view of the thesis and questions for consideration by the committee and the applicant.

The thesis general scope are diffusion properties of Group III and IV elements on crystalline substrates. In particular it focuses on formation of Sn and Al atomic chains on the Si(100) surface. The methodology is based on the combination of experiment and theoretical modelling: a variable temperature scanning tunneling microscope is used to obtain sequences of images and linescans in order to capture the temporal evolution of the system depending on the temperature and coverage. Results are statistically evaluated and simulated with a kinetic Monte Carlo (KMC) method.

Main outcomes of the work are activation energies for crucial processes and the frequency prefactors (atom hopping on the surface) that define the kinetics and the resulting morphology of the system. All the results fully comply with the topic of the thesis and the chosen methodology is appropriately chosen for this kind of study. Literature base is extensive although not exhaustive.

The topic can not be regarded as 'hot' and does not follow current trends in nanoscience, but on the other hand it seems to be well and carefully executed, especially in the part of the model and statistical evaluation. Such studies are still missing, likely due to the difficulties connected with a proper description. The language of the work is good which makes it relatively easy to read, although sometimes it becomes too complex or redundant (e.g. the mathematical descriptions and the Summary and Conclusions). There is also a slightly increasing number of typos and grammar errors towards the end of the work.

I have to note that I find the publication output rather low; there is only one PRB paper related to the thesis with the candidate as the first author, the rest are three proceedings from the annual doctoral week hosted by the faculty and one co-authored paper with unrelated topic. To decide whether or not this is sufficient and how it reflects the relevance of the research I leave up to the committee.

Despite this, I'd like to explicitly state that I believe the thesis is evidencing the ability of Mgr. Michael Alexandridis to perform creative work on his own.

I have some additional questions for the upcoming public defense talk:

1) What was the contribution of the candidate to the individual parts of the work? I am particularly interested in the KMC simulations.

2) In section 3.3, the assumptions for the rate equations; can you please explain the meaning and consequence of the assumption 5. "Islands with size < i are in local equilibrium with adatom population."

3) The histogram of the kink lifetimes in Fig.6.27f has unequal bins - how exactly was this histogram constructed, how were the binsizes chosen? What are the benefits of this representation?

4) The coverage has supposedly been evaluated from the STM images, sometimes with a very high precision (0.044, 0.059, etc.). Yet I have not seen any error bars for the coverage determination, can you provide some example error bar calculation to demonstrate the 1/1000-precision?

5) The "linescan" method has been used to follow the dynamics of the chains with a better time resolution; has it been in the constant-current mode? Would it be possible to perform it in a constant height or quasi-constant height mode? (with a very slow feedback to offset for the drift) What improvement in the temporal resolution could it bring?

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