Step edge adhesion of Co-Salen on a bulk NaCl (100) surface

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The self-assembly of metal-organic molecules Co-Salen ((Co(C16H14N2O2)) on the bulk NaCl(100) surface, has been measured using non-contact atomic force microscopy. These room temperature measurements, observe two different morphologies, a metastable nanowire and a stable nanocrystallite, both believed to consist of Co-Salen dimers [1]. However, from low temperature measurements it is known that the Co-Salen is individually deposited and adsorbed onto the surface. Therefore, it is believed that dimerization must occur on the surface. Experimentally, it is observed that the dimerization occurs at the step edges, but the precise process of how this occurs is not experimentally observable. In previous theoretical work, the single molecule adsorption on a flat terrace has been calculated [2,3]. In this work, we present the investigation into step edge adhesion of Co-Salen molecules and the role step edges plays in the dimerization process, using methods such as Density Functional Theory (DFT) and semi-empirical methods.

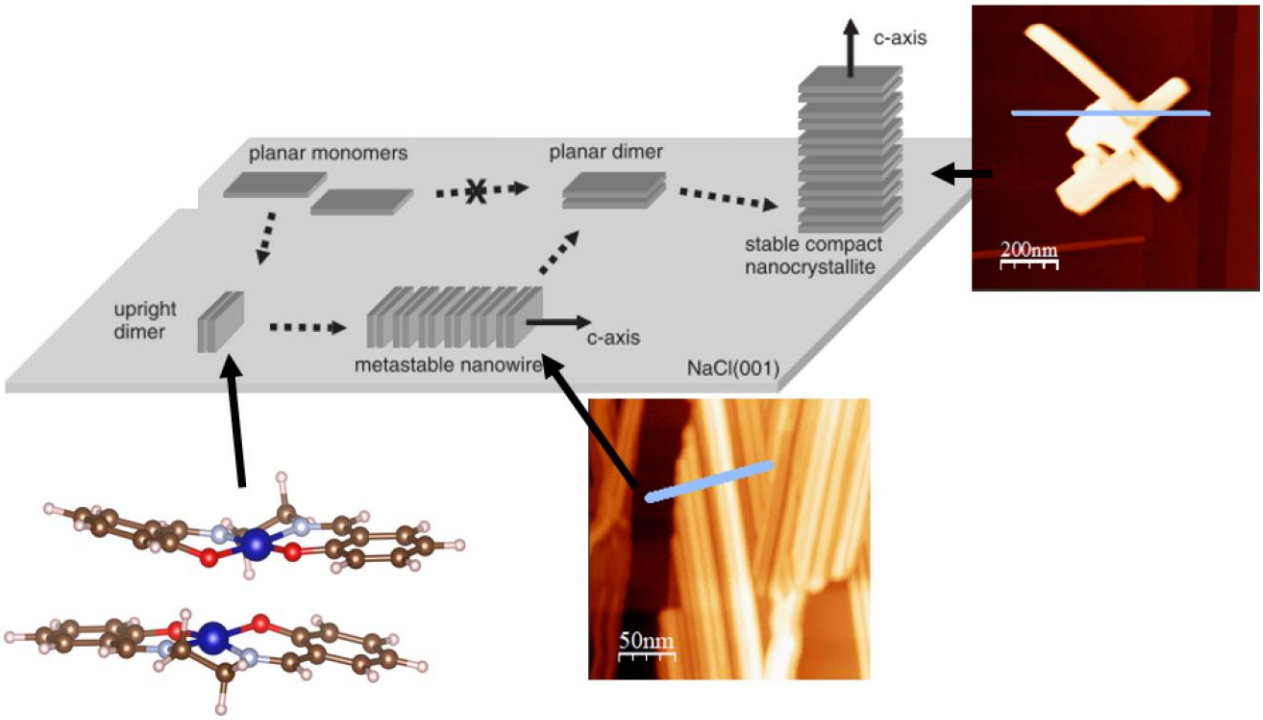

Figure 1 : Proposed growth mechanism of Co-Salen structures observed on NaCl(100) [1]

References:

[1] S. Fremy, et al “Nanotechnology, vol. 20, no. 40, p. 405608, 2009.

[2] Knud Lammle et al Nano Lett. 10, 2965 (2010)

[3] A. Schwarz et al. J. Phys. Chem. C, vol. 117, no. 1, pp. 1105–1112, 2013