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# The Role of Dangling Bond Diffusion in The Process of Self-Directed Growth of Molecular Assemblies on the H-Si(100)-3x1 Surface: from fabrication towards electrical transport measurements of hybrid silicon-molecular nano structures

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— A chain reaction initiated at a dangling bond on a H- terminated Si(100)-3x1 surface leads to the creation of contiguous, linear multimolecular assemblies. In contrast to a similar growth process observed on the H-Si(100)-2x1 surface, the linear structures grow in the cross-row direction, rather than parallel to dimer rows. This process is enabled by both an uncommonly high rate of H atom diffusion, specifically in the cross-row direction, and a low barrier to H atom abstraction from dihydride sites. These results demonstrate that anisotropy inherent to the substrate can be imposed upon molecular assemblies formed via this “self-directed” growth process. In addition, unlike in the case of styrene where H-abstraction is restricted to adjacent surface sites, resulting in straight multimolecular assemblies, a assembly process follows a meandering path via ring-opening radical clock reactions, which is a new self-directed growth mechanism and kinetic insights, will also be introduced.

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