

油水界面張力法を用いた単結晶ナノワイヤの基板上的での配列アレイ化  
—ミクロンパターンでナノスケールのサイズ選択性を生む仕組み—

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Controlling the post-growth assembly of nanowires is an important challenge in the development of functional bottom-up devices. Although various methods have been developed for the controlled assembly of nanowires, it is still a challenging issue to align selectively heterogeneous nanowires at desired spatial positions on the substrate. Here we report a size selective deposition and sequential alignment of nanowires by utilizing micrometer scale hydrophilic/hydrophobic patterned substrate. Nanowires dispersed within oil were preferentially deposited only at a water/oil interface onto the hydrophilic patterns. The diameter size of deposited nanowires was strongly limited by the width of hydrophilic patterns, exhibiting the nanoscale size selectivity of nanowires deposited onto micrometer scale hydrophilic patterns. Such size selectivity was due to the nanoscale height variation of a water layer formed onto the micrometer scale hydrophilic patterns. We successfully demonstrated the sequential alignment of different sized nanowires on the same substrate by applying this size selective phenomenon.

