

Patterned Growth of Vertically Aligned SWNTs through Liquid-based Catalyst Manipulation

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We present a versatile wet chemistry method to localize the growth of SWNTs to desired regions via surface modification. By functionalizing the silicon surface using a conventional self-assembled monolayer (SAM) and then selectively removing the SAM by ultraviolet (UV) light, the catalyst can be dip-coated onto only the hydrophilic areas of the substrate. This technique was successful in producing both random and aligned SWNTs with various patterns. (Schematic and examples in Figure) The precise control of the morphology of SWNTs, achieved by simple and scalable liquid-based surface chemistry, could facilitate the application of SWNTs as the building blocks of future nano-devices.

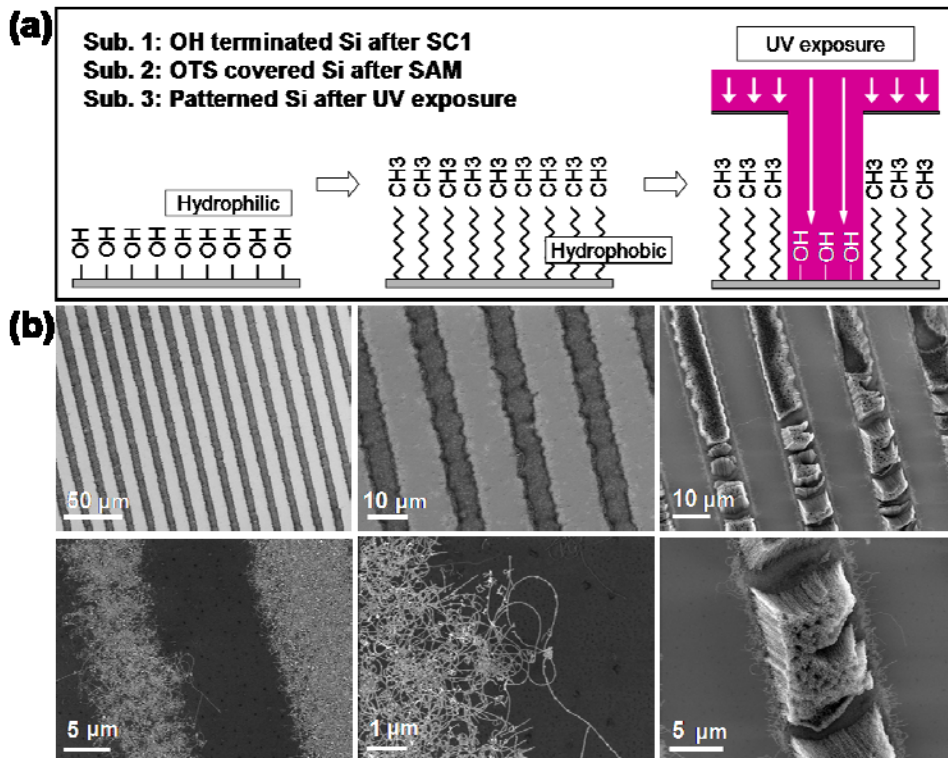


Figure. (a) Schematics describing the fabrication procedure of hydrophilic/hydrophobic patterns using a selective removal of OTS SAM by UV exposure; (b) SEM images of random and vertically aligned SWNT line-shape patterns.

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