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Self-assembled Silicon Nanotubes: new 1D semiconductors MING XIE, JIESHENG WANG, YOKE KHIN YAP[1], Michigan Tech University — Silicon nanotubes (SiNTs) have recently attracted attention because of the peculiar properties. SiNTs is also compatible to the present Si microelectronic technology. Theoretically, many research groups have investigated the possible existence of SiNTs. Experimentally, amorphous SiNTs have been synthesized by using template methods. Nevertheless, these SiNTs cannot form good crystal structure due to disordered aggregation of silicon atoms in the inner wall of the templates. Recently, self- assembled silicon nanotubes were reported, which have good crystal structure under supercritically hydrothermal conditions. Here we report self-assembled SiNTs via dual RF-plasma treatments. This technique is compatible to the present integrated circuit technology without involving excessive synthesis pressures and temperatures. Furthermore, our SiNTs are vertically aligned on substrates, which can be easily extracted for devices fabrication. Tunneling spectroscopy was used to characterize the local density of states of these SiNTs. Results indicate that these SiNTs are p-type semiconductors, a new 1D semiconductor for future nanoelectronic devices.

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