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1D and 2D molecules as nano-gadgets

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Isolated, long-chain and tubular molecules are actively studied for their possible application for the base structures in nano-technology. Their adsorption, manipulation and chemical reaction have been studied with atomic resolution with Scanning Tunneling Microscope (STM). A cryogenic scanning tunneling microscope is an ideal tool to perform this experiment since their surface diffusion can be frozen. As an example, application of single wall nanotubes and metallofullerene-nanotube peopods to molecular electronic devices will be presented. We have found that the local semiconducting-bandgap can be varied by introducing local elastic strain and charge transfer in nano-peopods. The local electronics structure is also varied with adsorbed molecules and intrinsic defects. The screen lengths around defects are much shorter than those around defects of chirality change. The origin of screening and physical implication will be discussed.