SELF-ASSEMBLY OF SUPRAMOLECULAR WIRES FROM LUTETIUM DOUBLE-DECKER CROWN-SUBSTITUTED PHTHALOCYANINE

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Herein we report a new strategy for fabricating extended conductive nanowires through self-assembly of double-decker tetra-15-crown-5-substituted lutetium phthalocyanine (LuL_2), potassium ions and ceria nanoparticles. The supramolecular structures were synthesized through a two-step procedure. The certain amount of CeO_2 was introduced into the solutions of LuL_2 from their hydrosol to form a layer of ligands on the particle surface. These modified particles act as crystallization seeds, which promote the formation of the supramolecular aggregates. The growth of supramolecular structure then proceeds through a coordination of crown-ether groups of LuL_2 with potassium ions after the adding of metal salt into the system. The as-formed crystalline structures were deposited onto the solid supports via dip coating. The hybrid assemblies were examined by SEM and X-ray methods showing the formation of 1D crystals with ultra-high aspect ratio and length up to 100 microns. The nanowires exhibited better electrical properties than those of previously reported one-dimensional organic nanostructures. We believe that these phthalocyanine-based nanowires might be useful for fabrication of organic electronic devices such as solar cells, transistors and sensing devices.

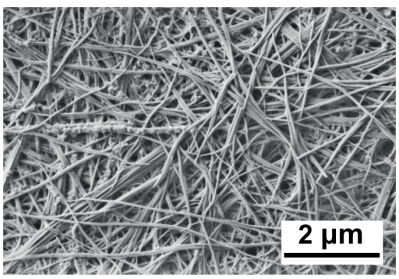

Figure 1. SEM image of phthalocyanine-based wires.

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