Carbon Nanotubes Functionalized With Metal Containing Block Copolymers and Their Applications in Optoelectronics

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A series of block copolymers containing metal complex and pyrene moieties was synthesized by controlled radical polymerization. The metal complexes functions as photosensitizers and the pendant pyrene moieties function as the anchoring unit on the surface of carbon nanotubes (CNTs). When multiwalled CNTs were functionalized with **Ru-b-py** (Fig. 1), the resulting polymer-carbon hybrid could be dispersed in DMF solution. In addition, the photocurrent response of the hybrid material was enhanced in by the ruthenium complexes. In another series of polymers (**tpy-b-py** and **py**), pyrenylcarbazole was used as the anchoring units. Upon attaching on CNT surface, significant change in the excited state properties of pyrenylcarbazole was observed. The excited state properties were investigated by femtosecond transient absorption spectroscopy. It was observed that the decay of excited pyrenylcarbazole was much faster compared to those polymers without CNT, indicating a very strong electronic interaction between the anchoring units and CNTs. These hybrid materials exhibit potentials in light harvesting, infrared sensing, and chemical sensing applications.

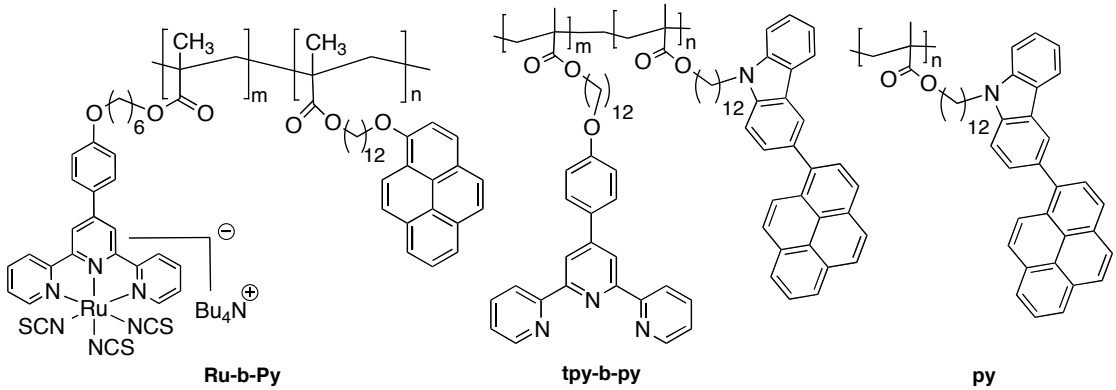

Figure 1. Block copolymers used for functionalization of carbon nanotubes.

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