Supplementary Information

Regulated dielectric loss of polymer composites from coating carbon nanotubes with a crosslinked silsesquioxane shell through free-radical polymerization

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TEM image of POS@CNT-B15.

The carbon nanotubes were also modified by the crosslinked MA-POSS with the same radical mechanism in the product of POS@CNT-B15 and POS@CNT-B20. Owing to the increased weight ratio of MA-POSS to MWCNT, the coated carbon nanotubes crosslinked each other and with POSS matrix. Instead of POSS coated MWCNT nanofiller, the final product looks like the MWCNT/crosslinked POSS composites, which is impossible to compound with polymers. A typical TEM image of POS@CNT-B1 was shown below:

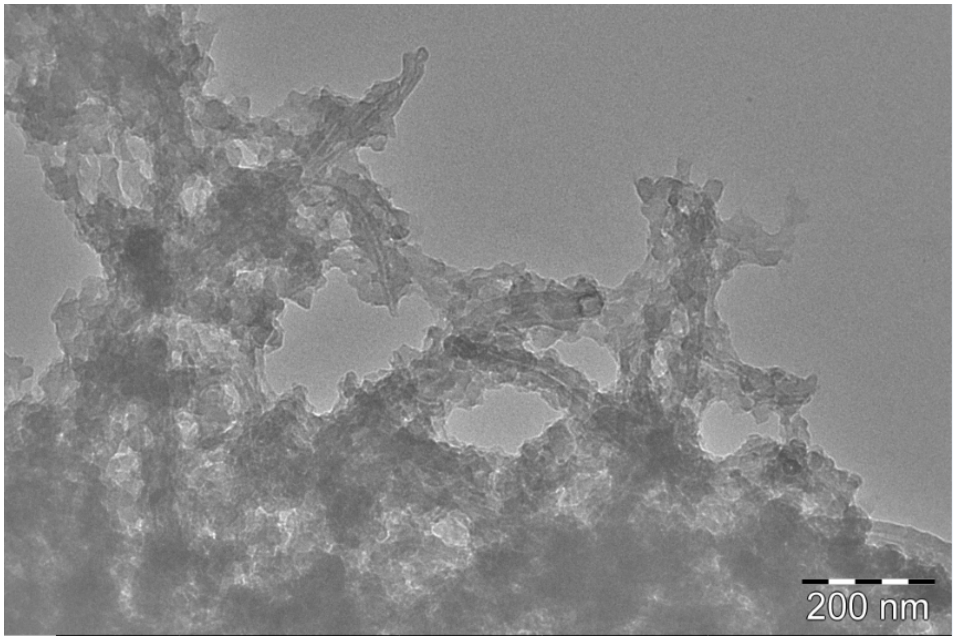

Figure S1 TEM image of POS@CNT-B15.

1. The possible reactive process of MA-POSS-coated MWCNT.

According to the results, free-radical initiators can initiate the monomers that contain the C=C bond to functionalize MWCNT and lead to controllable coating on the surface of MWCNT. Through our study, we determined a possible way of coating.

First, the initiators generate the radicals through decomposition. Second, the free radicals combine with MWCNT or MA-POSS, and then form the new reactivity center. Finally, the MA-POSSs react around the reactivity center and realize the coating of MWCNT, as shown in Figure S2.

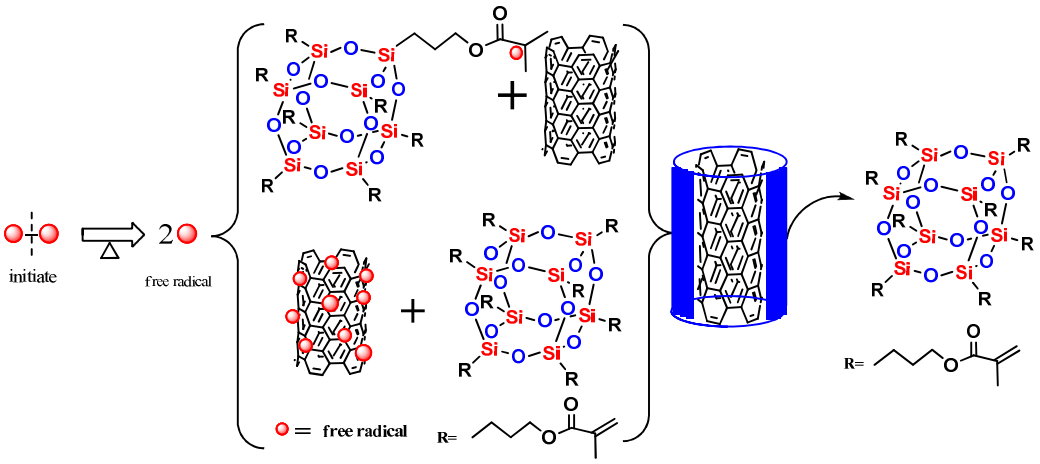

Figure S2 Possible reactive process of MA-POSS-coated MWCNT.

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