Heteroatoms doped mesoporous carbon nanotubes are produced via facile carbonization of highly cross-linked polyphosphazene nanotubes under inert atmospheres. Tubular structure of the polymeric nanotubes can be easily maintained through carbonization due to the highly cross-linked structure. High level of heteroatoms and uniform mesopores are incorporated into the carbon nanotubes. Via introduction cobaltous acetate to the polyphosphazene nanotubes, followed by a carbonization process, cobalt phosphide nanoparticles decorated heteroatoms doped mesoporous carbon nanotubes can be synthesized. Electrochemical tests manifest good oxygen reduction catalytic performance and supercapacitor performance of the carbon nanotubes. The doping structure can form active sites on the carbon nanotube surface. Synergetic effect between cobalt phosphide and heteroatoms doped structure could greatly enhance the oxygen reduction catalytic performance. Uniform mesoporous structure, and homogeneous tubular morphology provide the materials with high surface utilization efficiency and enhanced mass transfer ability, contributing to the high electrochemical performance of the novel carbon nanotubes.
Short Biography

Xiaobin Huang is an associate Professor in the school of Aeronautics and Astronautics at Shanghai Jiao Tong University. He obtained his Ph.D. from Shanghai Jiao Tong University in 2004. He has conducted intensive research in the field of synthesis and application of organic-inorganic hybrid nanomaterials since 2004. His group firstly discovered a facile and low cost technique for producing polyphosphazene (PZS) nano/micro materials in 2006, and successfully transforming them into mesoporous carbon nanomaterials. The high performance and low cost carbon materials show great potential in replacing CNTs or graphene in energy storage applications. He has published more than 80 peer-reviewed publications and 11 China patents.