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### Article

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# Fine decoration of carbon nanotubes with metal organic frameworks for enhanced performance in supercapacitance and oxygen reduction reaction

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## Abstract

Efficient electrode material is crucial for energy conversion from renewable sources such as solar electricity. We present a method for preparation of carbon nanotubes (CNTs) with zeolitic imidazolate frameworks (ZIFs, e.g., ZIF-8) via an in situ pyrolysis process. The resultant materials are completely new carbon composites with desirable hierarchical porosity and nitrogen-doped features. Electron microscopy images show that CNTs with small external diameters enable more uniform dispersion of ZIF-8-derived carbons, subsequently yielding a unique hierarchically porous structure. Such carbon shows superior activity in oxygen reduction reaction (ORR) and high

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