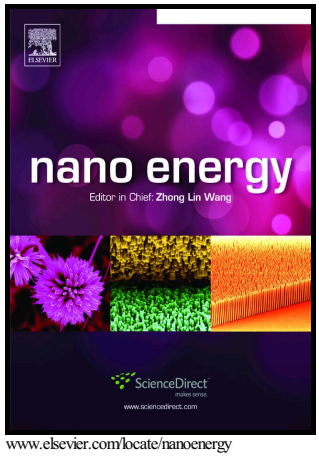

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Abstract

The mass loading of the active materials in most flexible electrodes is relatively low, which greatly impedes their practical application. Here, we report a facile strategy to achieve high mass loading of $Na_3V_2(PO_4)_3$@carbon (NVP@C) supported on carbon cloth (NVP@C-CC) by a two-step coating followed by an annealing treatment and the resultant NVP@C-CC membrane can be used as a binder-free cathode for sodium ion batteries (SIBs). The NVP@C is not only uniformly anchored on the surface of carbon fibers of CC, but also filled between carbon fibers of CC in interconnected three-dimensional (3D) macroporous structure. It is because of the full use of the spaces between carbon fibers of CC that we achieve a high NVP@C mass loading. Thus-obtained NVP@C-CC exhibits excellent cyclability (82.0% capacity retention over 2000 cycles at 20 C) and high rate capacity (96.8 mA h g^{-1} at 100 C and 69.9 mA h g^{-1} at 200 C) for sodium half cells and meanwhile the high mass loading of NVP@C on CC also endows the cell with fairly high energy and powder densities of 396 W h kg^{-1} and 97 kW kg^{-1}. Furthermore, it also