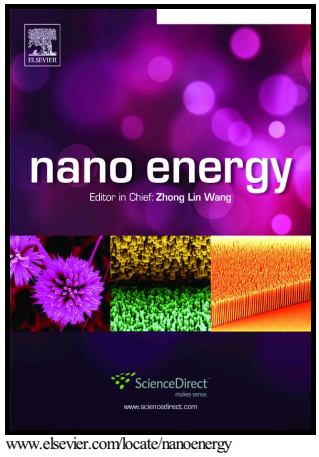

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Abstract

Nanostructured ultrathin catalyst layer based on open-walled PtCo bimetallic nanotube arrays has been designed and constructed through a hydrothermal and physical vapor deposition method for proton exchange membrane fuel cells (PEMFCs). The open-walled PtCo bimetallic NTAs with a diameter ca. 100 nm were directly aligned with proton exchange membrane, forming an ultrathin catalyst layer with a thickness ca. 300 nm. The incorporation of Co in Pt is realized by a facile thermal annealing method, endowing the catalyst layer with improved activity. During the purification of catalyst-coated-membrane (CCM) electrode, the sealed off PtCo nanotubes cracked into open-walled nanotubes, making both the interior and exterior