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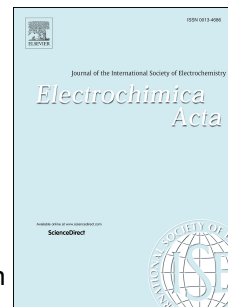
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Worm-like PtP Nanocrystals Supported on NiCo₂P_x/C Composites for Enhanced Methanol Electrooxidation Performance

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ABSTRACT: Worm-like PtP nanocrystals supported on NiCo₂P_x/carbon black (NiCo₂P_x/C) composites were prepared by a combined hydrothermal, low temperature phosphidation and NaBH₄ reduction process. Noteworthily, the presence and content of phosphorus (P) play a critical role in constructing one-dimensional (1D) PtP nanostructures. Electrochemical tests demonstrate that the obtained PtP-NiCo₂P_x/C hybrid exhibits an extremely high mass activity of 1361 mA mg⁻¹_{Pt} for methanol electrooxidation in acidic medium, which is 3.5- and 7.6-fold greater than those of commercial Pt/C (393 mA mg⁻¹_{Pt}) and home-made Pt/C catalyst (180 mA mg⁻¹_{Pt}), respectively. Meanwhile, the catalytic performance of PtP-NiCo₂P_x/C is also better than those of the PtP-CoP/C and PtP-Ni₂P/C catalysts due to the synergistic effect of Co and Ni. Furthermore, PtP-NiCo₂P_x/C catalyst exhibited better durability and CO tolerance compared with other catalysts in this study. The enhanced catalytic performance of PtP-NiCo₂P_x/C hybrid can be attributed to the special 1D morphology of PtP nanocrystals, the strong interaction between catalytic species and support, as well as the existence of metal center (M^{δ+}, M = Ni or Co) and P^{δ-} active sites for the

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