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Title:	Pd–Pt alloys nanowires as support-less electrocatalyst with high synergistic enhancement in efficiency for methanol oxidation in acidic medium
Authors:	Rana, M. (/jspui/browse?type=author&value=Rana%2C+M.) Gautam, U.K. (/jspui/browse?type=author&value=Gautam%2C+U.K.)
Keywords:	Metal nanowires Galvanic displacement Electrocatalysis Methanol oxidation DMFC
Issue Date:	2016
Publisher:	Elsevier Ltd
Citation:	Journal of Colloid and Interface Science, 463, pp. 99-106
Abstract:	In a facile approach, Pd <sub>73</sub> Pt <sub>27</sub> alloy nanowires (NWs) with large aspect ratios were synthesized in high yield by using sacrificial templates. Unlike majority of processes, our synthesis was carried out in aqueous solution with no intermittent separating stages for the products, while maintaining the NW morphology up to ~30% of Pt. Upon evaporation of their dispersion, the NWs transform into a stable porous membrane due to self-entanglement and can be directly lifted and employed for electrocatalytic applications without external catalyst supports. We show that the NW membranes exhibit efficient electrocatalytic performance for methanol oxidation reaction (MOR) with 10 times higher mass activity and 4.4 times higher specific activity in acidic media as compared to commercial Pt catalysts. The membrane electrocatalysts is robust and exhibited very good stability with retention of ~70% mass-activity after 4000 potential cycles. Since Pd was found to be inert towards MOR in acidic medium, our investigation provides a direct estimate of synergistic enhancement of efficiency. Over 10 times increment of mass activity appears to be significantly higher than previous investigations in various other reaction media.
Description:	Only IISERM authors are available in the record.
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