Title:	Petal-like hierarchical array of ultrathin Ni(OH)2 nanosheets decorated with Ni(OH)2 nanoburls: a highly efficient OER electrocatalyst†
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Abstract:	Electrocatalytic water splitting by non-noble-metal-based catalysts is the focus of attention in energy conversion technology. Group VIII 3d metals and their compounds are the often chosen catalysts for the same. Herein, we have demonstrated an easy way to synthesize one such efficient catalyst from β-Ni(OH)2, which has a petal-like morphology as a result of the formation of a 3D hierarchical array of interwoven ultra-thin β-Ni(OH)2 nanosheets decorated with β-Ni(OH)2 nanoburls. The electrocatalytic activity in the oxygen evolution reaction (OER) of the hierarchical array of ultra-thin β-Ni(OH)2 nanosheets decorated with β-Ni(OH)2 nanoburls displayed an unusual enhancement as a consequence of surface faceting of diffraction planes from (001) to (101) and (111) in addition to the formation of oxyhydroxide upon potential cycling. The solvothermally synthesized petal-like 3D hierarchical array of β-Ni(OH)2 nanosheets and nanoburls activated by faceting and the formation of oxyhydroxide exhibited a lower overpotential (η = 0.300 ± 0.003 V @ j = 10 mA cm−2), a minimum Tafel slope (0.043 V dec−1), and very high turnover frequency (TOF = 47.14 s−1 @ 1.53 V vs. RHE) with very high faradaic efficiency when compared to earlier studies on Ni(OH)2. Regardless of the type of polymorph, our catalyst have performed better than the state-of-the-art RuO2 catalyst under the same experimental conditions.
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