Exfoliated WS_2 interfacing Ni-porphyrin with (photo)electrocatalytic activity for the oxygen evolution reaction

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Interfacing exfoliated tungsten disulfide (WS_2) with M-N_4 motifs (M: Ni, Co, Fe etc.) holds a strong potential towards new hybrid nanoelectrocatalysts for the bottleneck of water-splitting procedure, oxygen evolution reaction (OER). WS_2, a well-known member of transition metal dichalcogenides (TMDs) group, is considered ideal substrate for (photo)electrocatalytic applications.[1] Its poor affinity for oxygen species adsorption can be ameliorated by conjugating transition metal carrier systems, where the metal center plays the core part for binding oxygen species. M-N_4 motifs are considered single atom catalyst (SAC) systems and can be found in metal-porphyrins, which apart from being catalytically active at a molecular level, also stand out as excellent photoactive species.[2] In this work, hybrids based on covalently grafted Ni-porphyrin onto WS_2, exhibit comparable activity with the state-of-the-art RuO_2 catalyst for water oxidation. Markedly, this system performs even better under light illumination, in a more realistic photoelectrocatalytic setup (**Figure 1**).[3]

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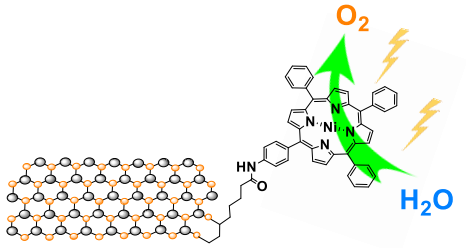

Figure 1. Exfoliated WS_2 interfacing Ni-porphyrin as a hybrid (photo)electrocatalyst for water oxidation.

References

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