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A Fluorescence-Based Screening Protocol for the Identification of Water Oxidation Catalysts

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Abstract:

Efficient catalysts are crucial for the sustainable generation of fuel by splitting water. A versatile screening protocol would simplify the identification of novel and better catalysts by using high throughput experimentation. Herein, such a screening approach for the identification of molecular catalysts for chemical oxidation of water is reported, which is based on oxygen-sensitive fluorescence quenching using an OxoDish. More than 200 reactions were performed revealing several catalysts, for example, a dinuclear Fe complex that produced oxygen under the used reaction conditions. Clark electrode measurements confirmed a similar rate in oxygen evolution, making the developed parallel screening approach a robust and versatile tool to screen for molecular water oxidation catalysts using chemical oxidants under acidic and neutral conditions.

Keywords: High-throughput screening, homogeneous catalysis, iron, oxygen evolution, water oxidation