# Article information:

Chemical and structural origin of lattice oxygen oxidation in Co–Zn oxyhydroxide oxygen evolution electrocatalysts | Nature Energy
<https://www.nature.com/articles/s41560-019-0355-9>

# Article summary:

1. The oxygen evolution reaction (OER) involves multiple adsorbed intermediates, leading to a minimum theoretical overpotential of about 0.37 V.

2. Transition metal oxyhydroxides (MOOH) are often the real catalytically active species generated from irreversible surface reconstruction on many types of oxygen-evolving materials.

3. The article reveals that creating oxygen holes in ONB states along the specific local configuration is critical to regulating the OER mechanism and offers a guideline for the development of efficient catalysts towards water oxidation or other heterogeneous catalysis participated by lattice oxygen.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article provides an in-depth analysis of the chemical and structural origin leading to the lattice oxygen oxidation mechanism (LOM), which has been suggested to be able to bypass the limitation of conventional adsorbate evolution mechanism (AEM). The authors use CoOOH as a model material, incorporating low-valence and catalytically inactive Zn2+(d10) ions to form accessible oxygen non-bonding (ONB) states with different local configurations. By combining theoretical and experimental approaches, they reveal that creating oxygen holes in ONB states along the specific local configuration is critical to regulating the OER mechanism and offer a guideline for developing efficient catalysts towards water oxidation or other heterogeneous catalysis participated by lattice oxygen.

The article is generally reliable and trustworthy, providing detailed information on its research methods and results. It also presents both sides equally, exploring possible counterarguments and noting potential risks associated with its findings. However, it does not provide any evidence for some of its claims made, such as that transition metal oxyhydroxides are often the real catalytically active species generated from irreversible surface reconstruction on many types of oxygen-evolving materials. Additionally, there is no discussion on how this research could be applied in practical scenarios or what implications it may have for future research in this field.

# Topics for further research:

* Practical applications of lattice oxygen oxidation mechanism
* Implications of lattice oxygen oxidation mechanism for future research
* Transition metal oxyhydroxides catalytic activity
* Irreversible surface reconstruction on oxygen-evolving materials
* Low-valence and catalytically inactive Zn2+ ions
* Oxygen non-bonding states local configurations

# Report location:

<https://www.fullpicture.app/item/92e0c58719581a8274cc531d3da18bd2>