

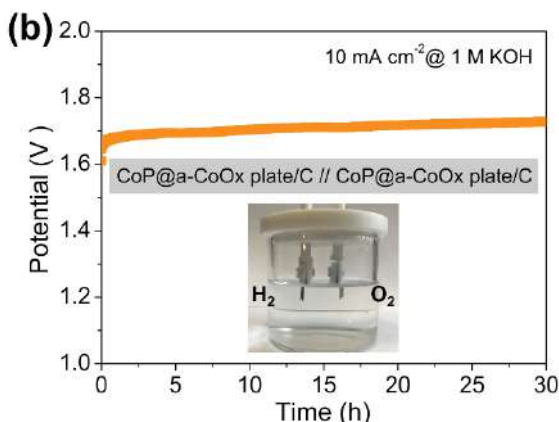
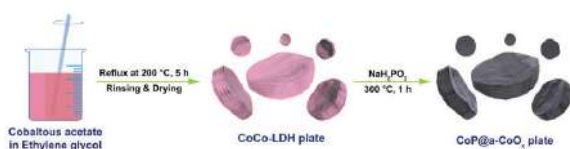
# Electrochemical Water Splitting Catalysts with Nanostructure 具有納米結構的電化學水分解催化劑

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## Special features 技術特點

▶ *Low cost hydrogen fuel technology*  
低成本氫燃料技術

▶ *Water splitting achieved at low voltage of 1.66V at 10mA/cm<sup>2</sup> for continuous 30 hours operation*  
可連續30小時於10mA/cm<sup>2</sup>的低電壓1.66V下實現水分解



Hydrogen production by electrochemical water-splitting is a very promising method and a key technology for hydrogen fuel cell vehicles. It is also important to support the application of intermittent and fluctuating renewable solar and wind power. Conventional electrolyzers for water splitting employ expensive catalyst such as Pt, which in turn causes high cost of electrolyzers.

Pt-free catalyst heterostructured CoP@a-CoOx plate is designed, which consisting of the embedded crystalline cobalt phosphide (CoP) nanoclusters and amorphous cobalt oxides (CoOx) nanoplates matrix for use as oxygen evolution reaction (OER) and hydrogen evolution reaction (HER). It is found that the composite material exhibits comparable activity with the traditional Pt-based catalyst but the use of Pt is reduced to zero (reduced the cost substantially). In addition, the developed catalyst exhibits good stability for hydrogen and oxygen production by water splitting.

The technology can be applied for hydrogen and oxygen production at large scale, which allow the use of excessive solar and wind power for hydrogen generation to support the hydrogen fuel cell vehicle development.

電化學分解水製氫和氧是非常有前景的製氫技術，可應用於汽車氫燃料電池，或具有高度波動性和間歇性的可再生太陽能和風能。傳統的電解槽需要用到昂貴的催化劑(如鉑)，導致成本較高，阻礙了電解技術的廣泛應用。理大團隊開發了無鉑的異質結構CoP@a-CoOx複合型催化劑，可以用於分解水製氫和氧。此催化劑具有和鉑催化劑相當的催化活性，工作穩定性高，可完全取代了鉑，把生產成本大大降低。當應用於大規模的分解水製氫和製氧時，可進一步發展可再生能源及汽車氫燃料電池。



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