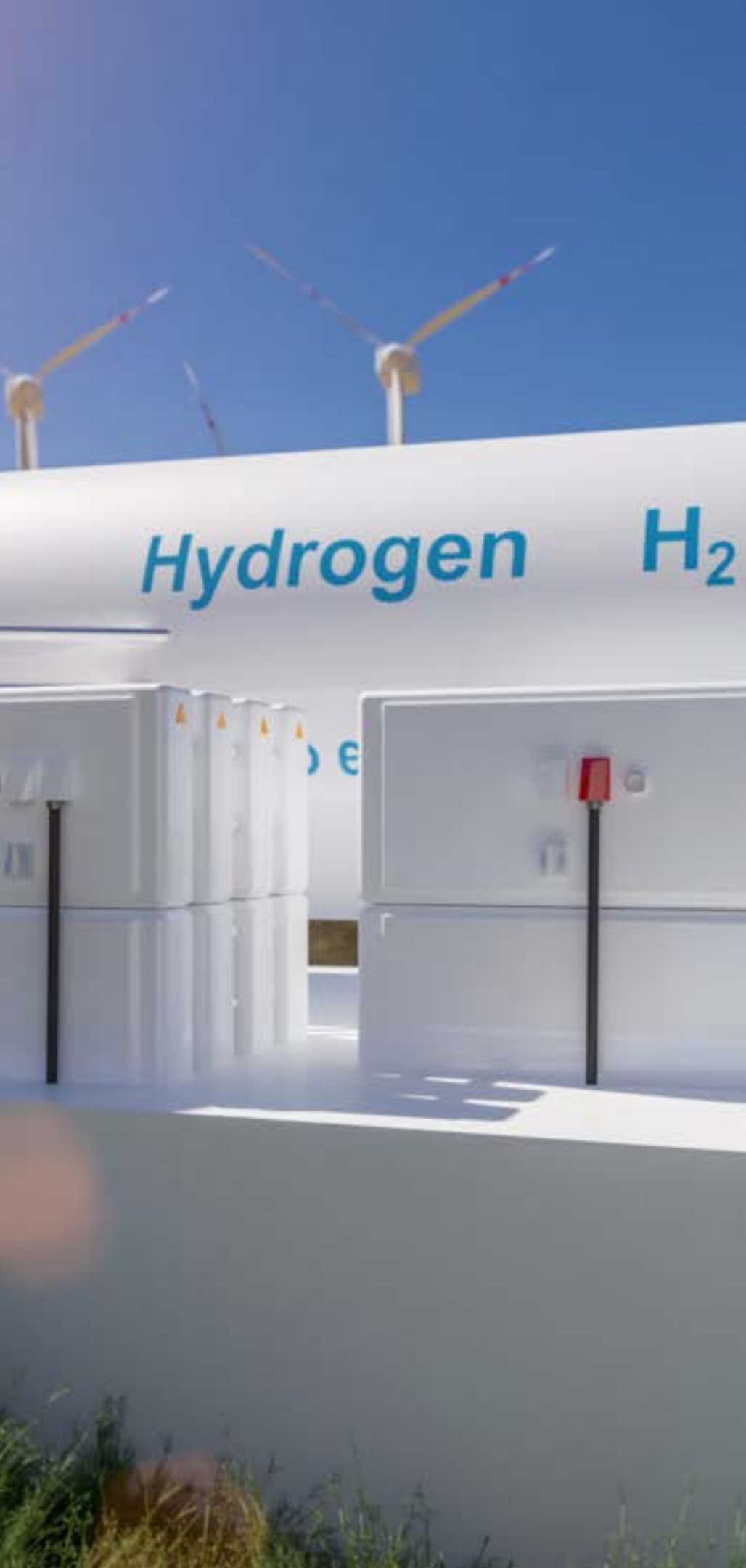


Development of Regular Macroporous Structure for Highly Efficient Hydrogen Evolution Reaction

7 AFFORDABLE AND CLEAN ENERGY



Introduction



- People are looking into **new renewable energy sources** to replace conventional fossil fuels
- **Hydrogen** is one of the most promising alternative energy sources due to its:
 - **high energy density**
 - **sustainability**
 - **cleanliness**





Recent Challenges



Platinum (Pt)

- broad use is severely constrained by **the earth's limited supply** and **high cost**.

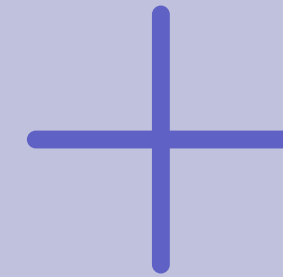


Acidic hydrolysis

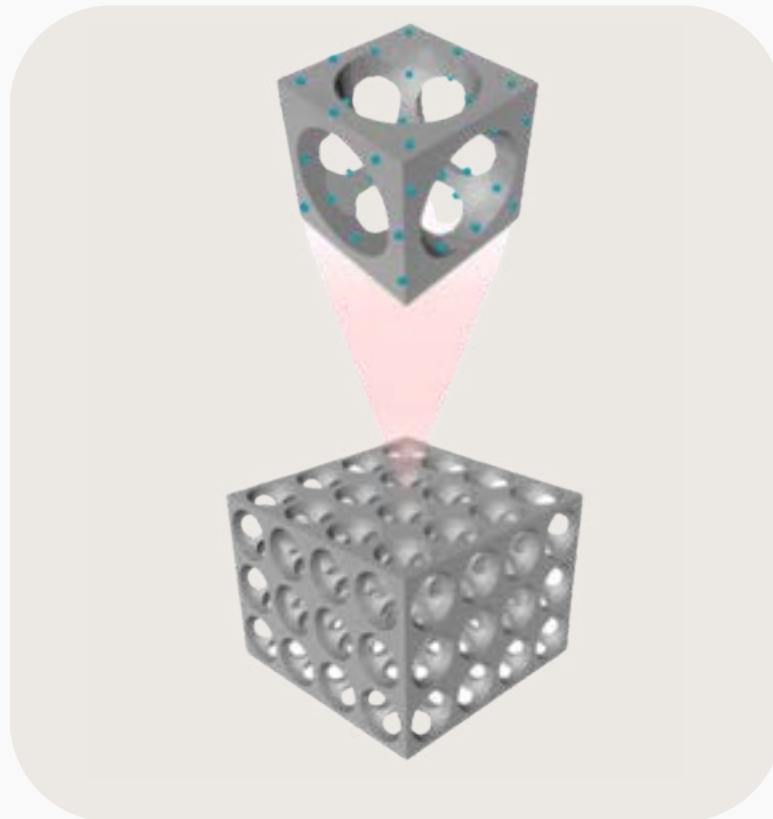
- the electrolyte would **damage the electrodes**.

Objective

a 3D ordered macroporous structure
Mo₂C-embedded nitrogen-doped carbon
(RMS Mo₂C/NC)

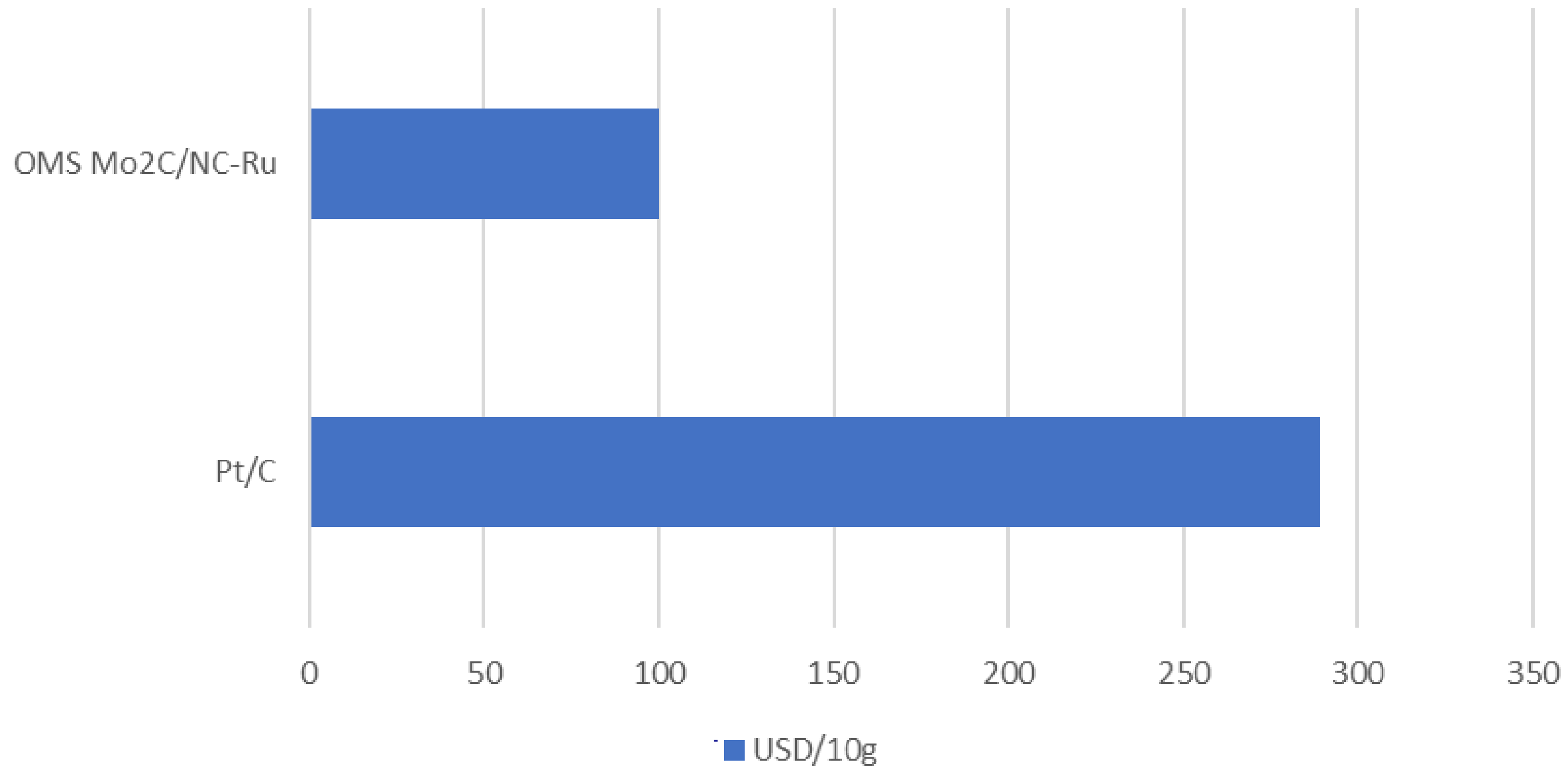


Ru nanoclusters

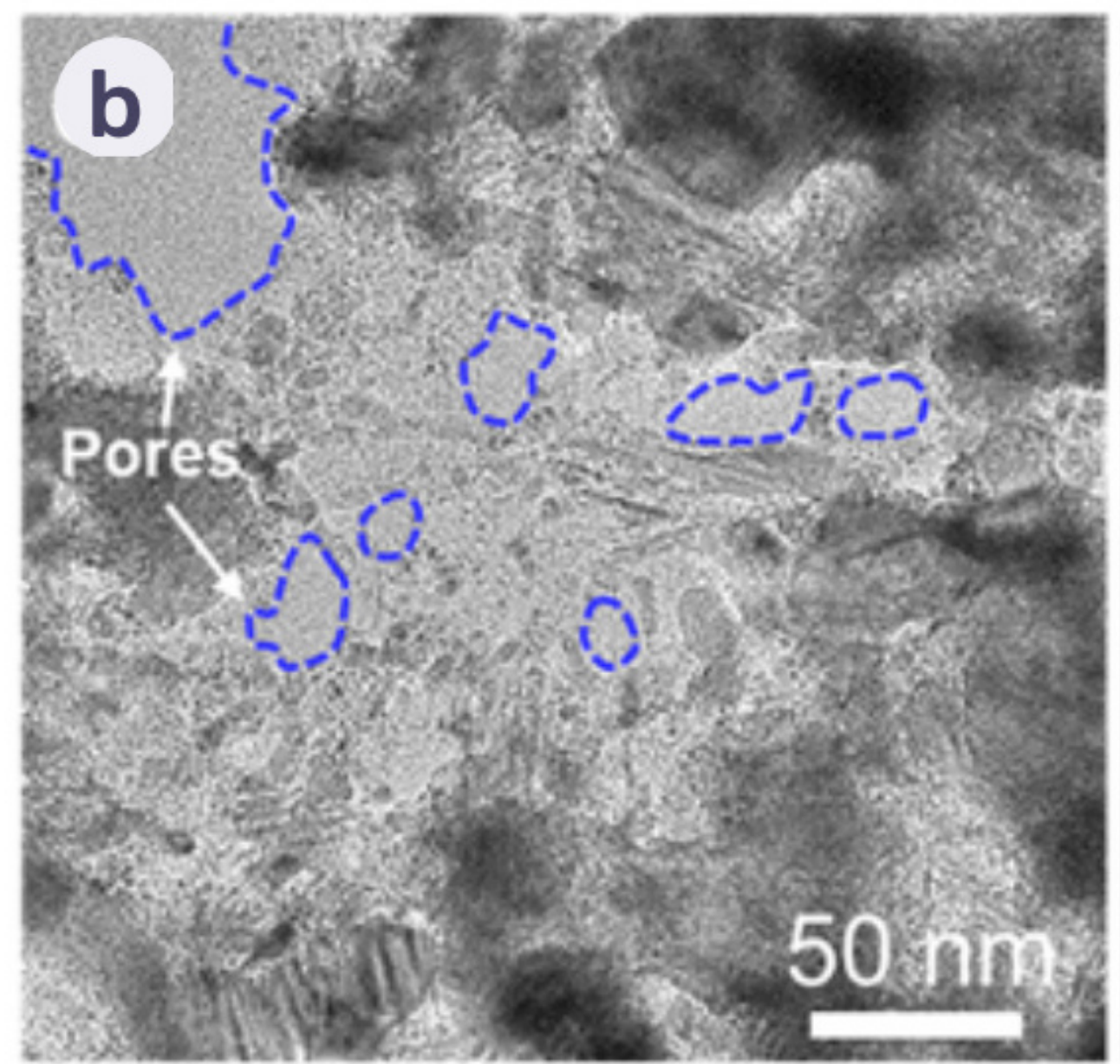
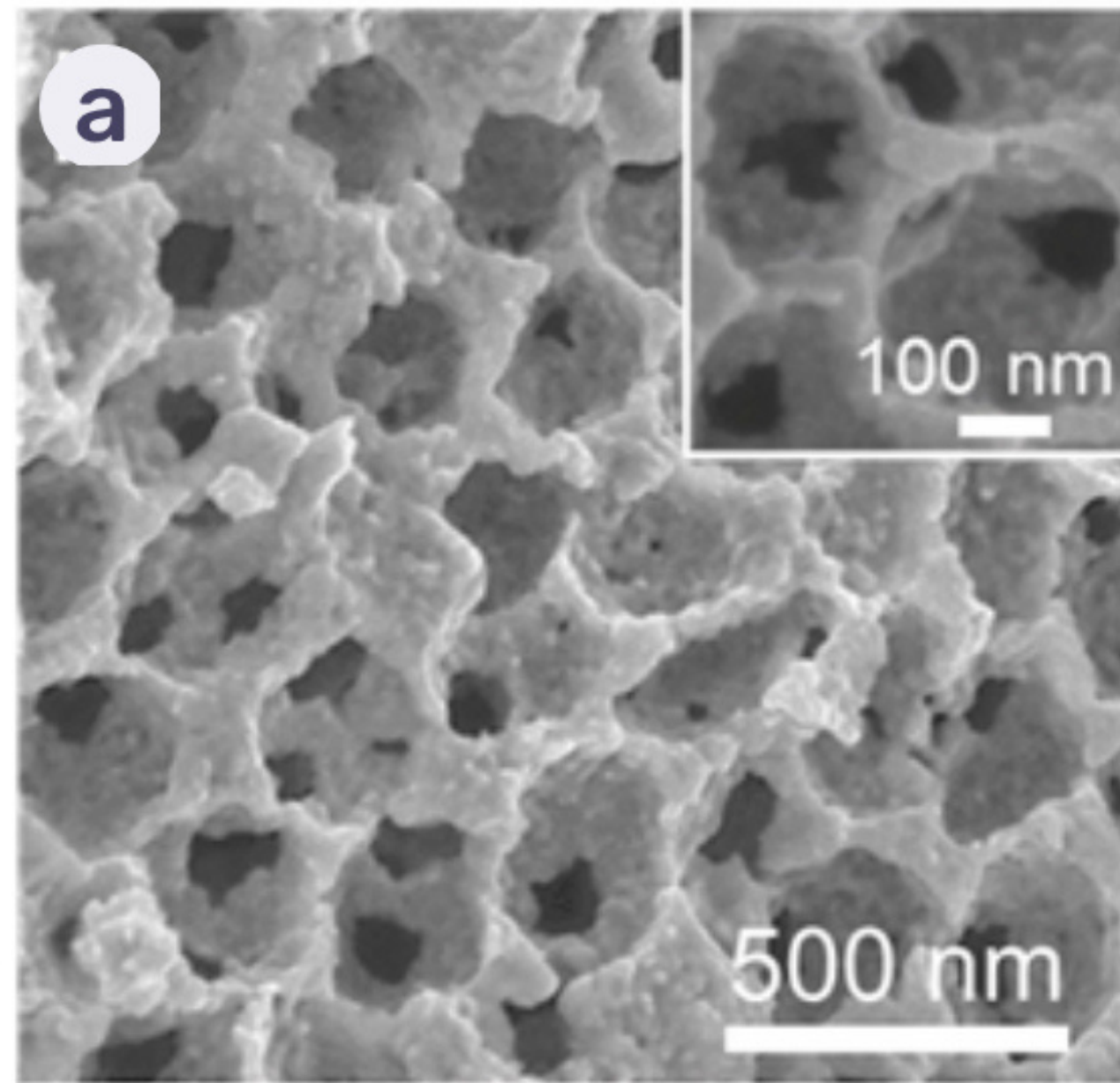


a hierarchically multiheterogeneous
RMS Mo₂C/NC-Ru composite

Price of catalysts

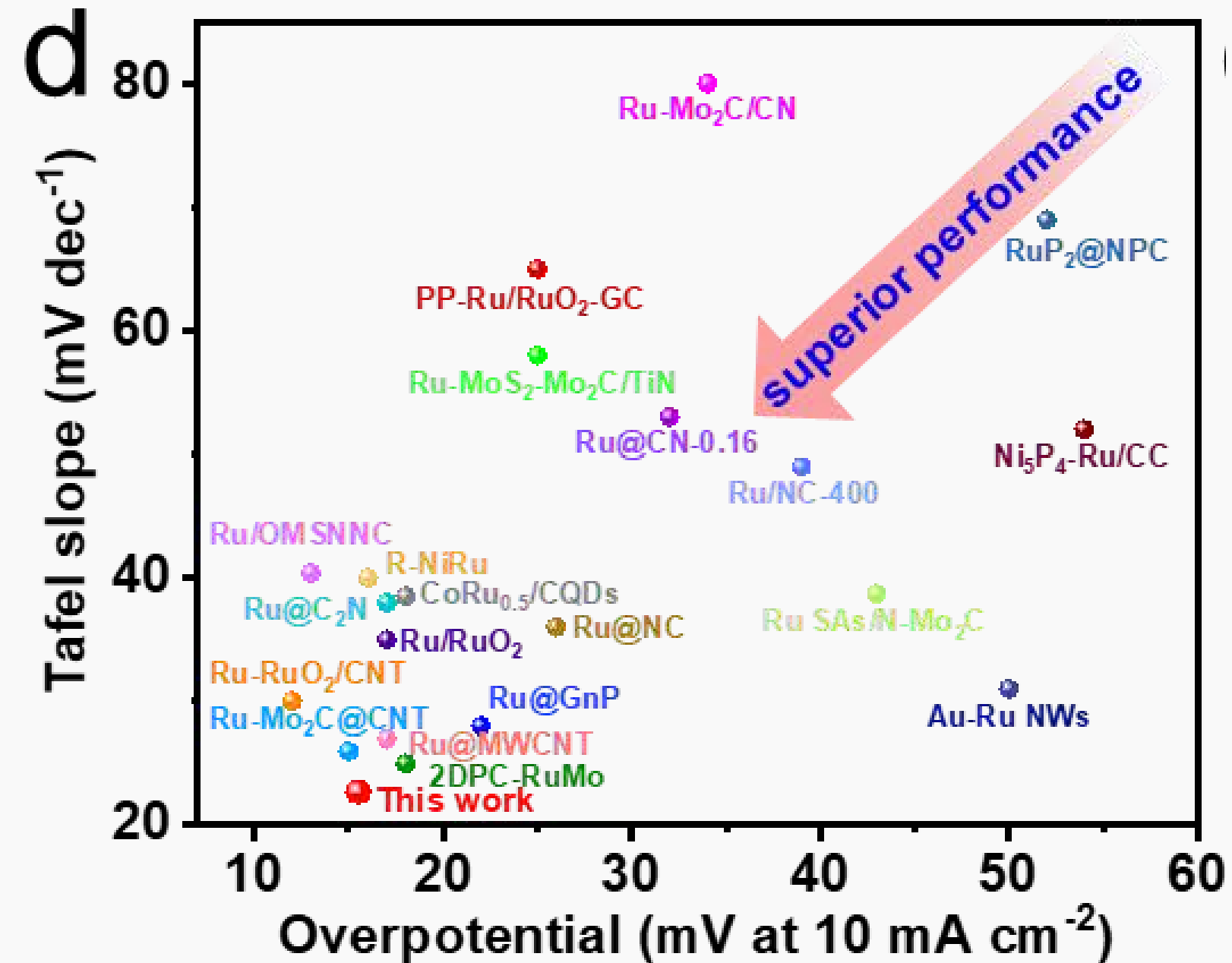


Results



SEM and TEM images of OMS Mo₂C/NC-Ru

Results

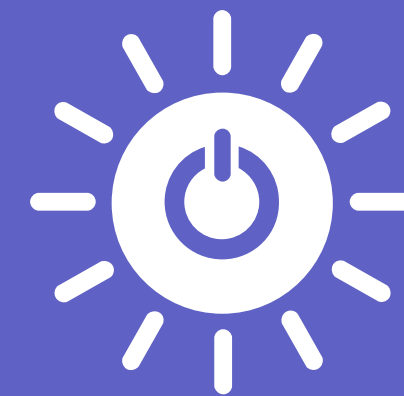


Comparison of the Tafel slope and overpotential at 10 mA cm⁻² in 1.0 M KOH for OMS Mo₂C/NC-Ru with other recently reported HER catalysts.

Conclusion



7 AFFORDABLE AND
CLEAN ENERGY



- Established a **hierarchically multiheterogeneous RMS** for reliable hydrogen production
- The catalyst has surpassed commercial Pt/C:
 - improved **mass transport capabilities**
 - beneficial **gas release mechanism**
 - excellent **HER activity**
 - immensely **low overpotential** (15.5 mV at 10 mA cm²)
 - exceptional **electrocatalytic endurance**

2022

Thank you!

Development of Regular
Macroporous Structure for
Highly Efficient Hydrogen Evolution Reaction

7 AFFORDABLE AND
CLEAN ENERGY

