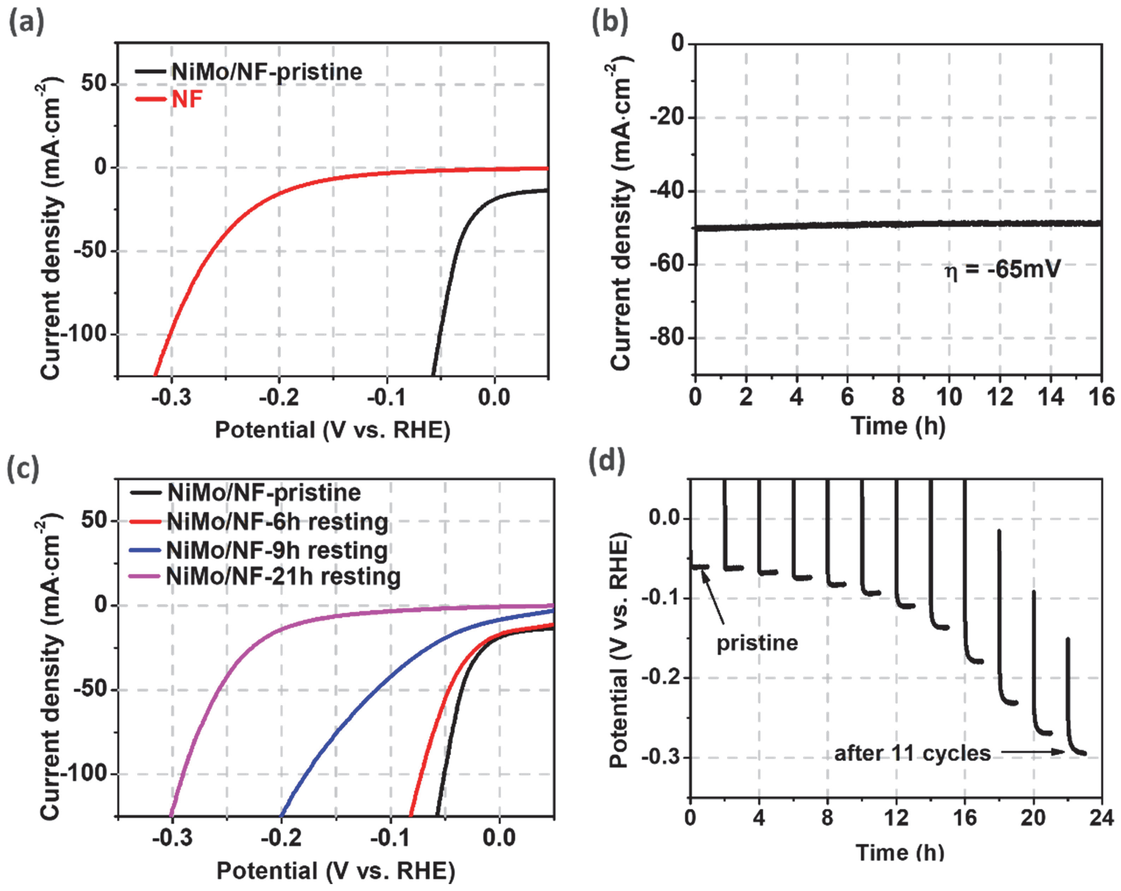
Stabilizing the unstable: chromium coating on NiMo electrode for enhanced stability in intermittent water electrolysis

Lingyi Peng
School of Chemical Engineering, University of New South Wales

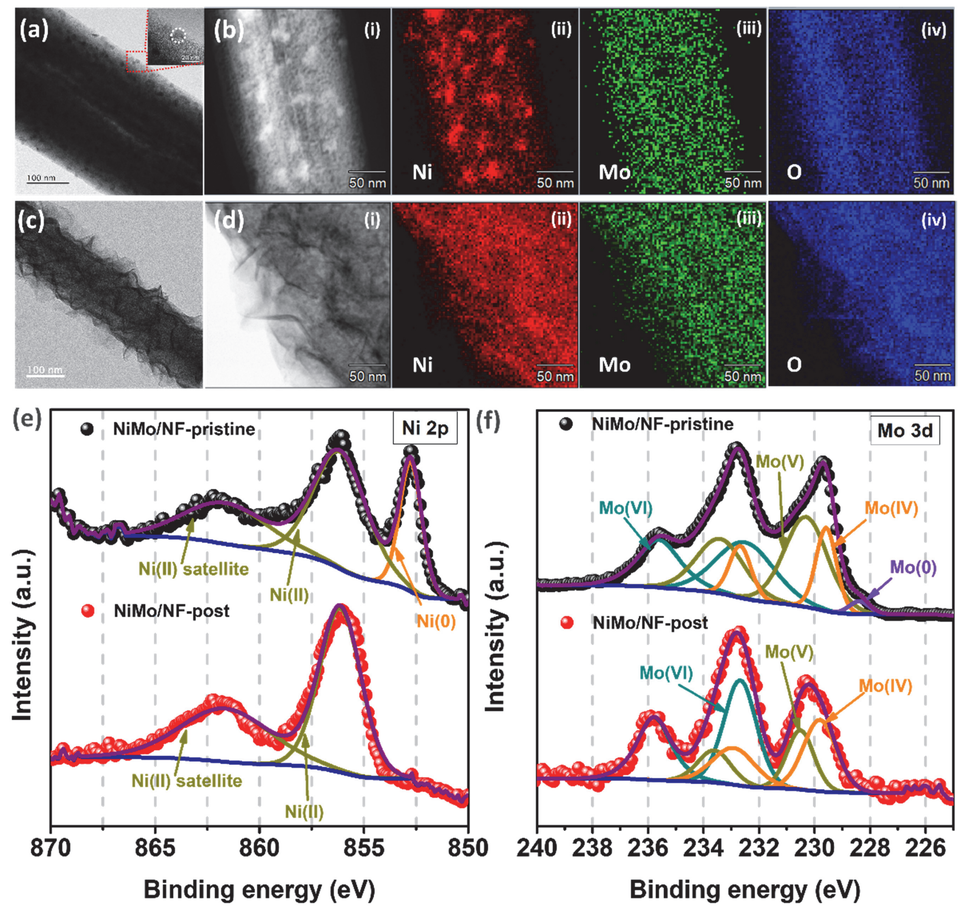
Research highlight

- Intermittent water electrolysis is a common scenario in practice especially when electrolysers are directly coupled with renewable energy resources
- NiMo electrodes for hydrogen evolution reaction (HER) are highly active stable in constant electrolysis yet unstable in intermittent electrolysis
- The cause of instability is identified to be the oxidation by dissolved oxygen
- Chromium (Cr) coating is applied as to prevent oxidation and achieve significant stability improvement

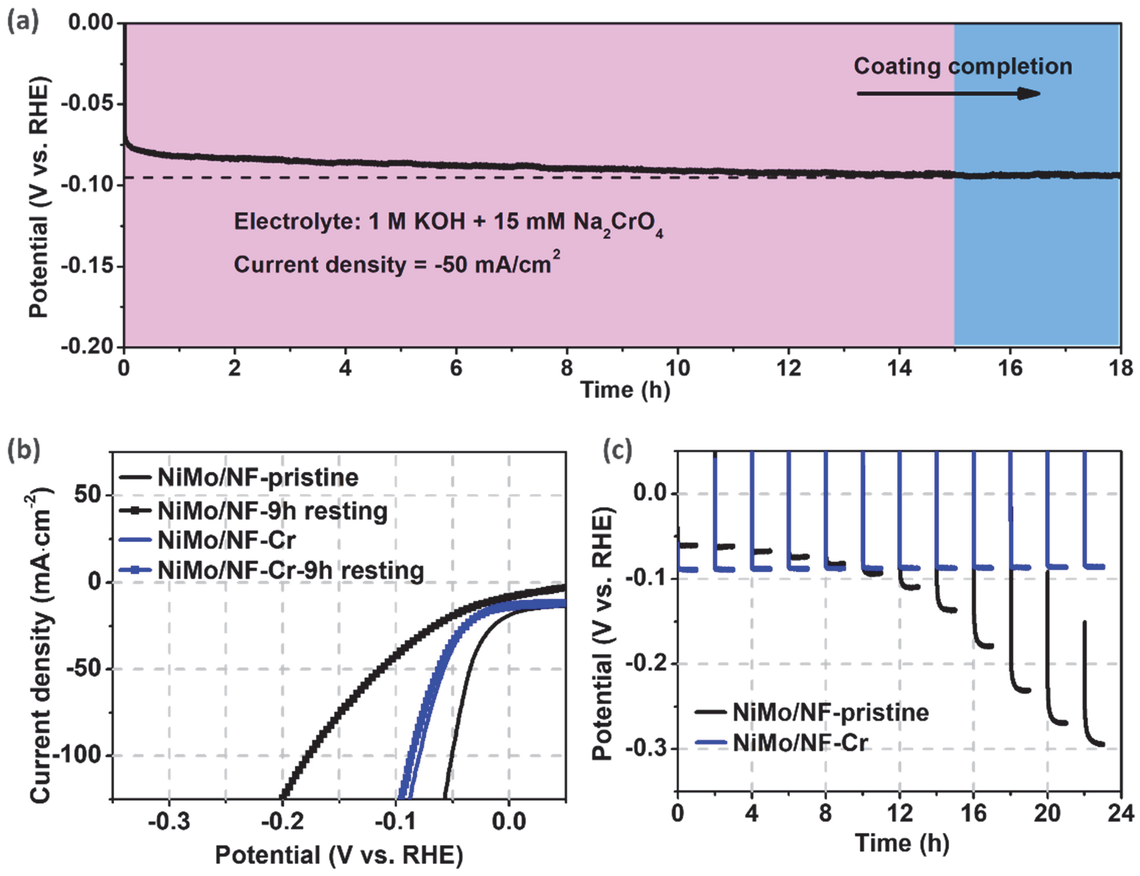
HER performance of NiMo electrodes in constant vs. intermittent electrolysis



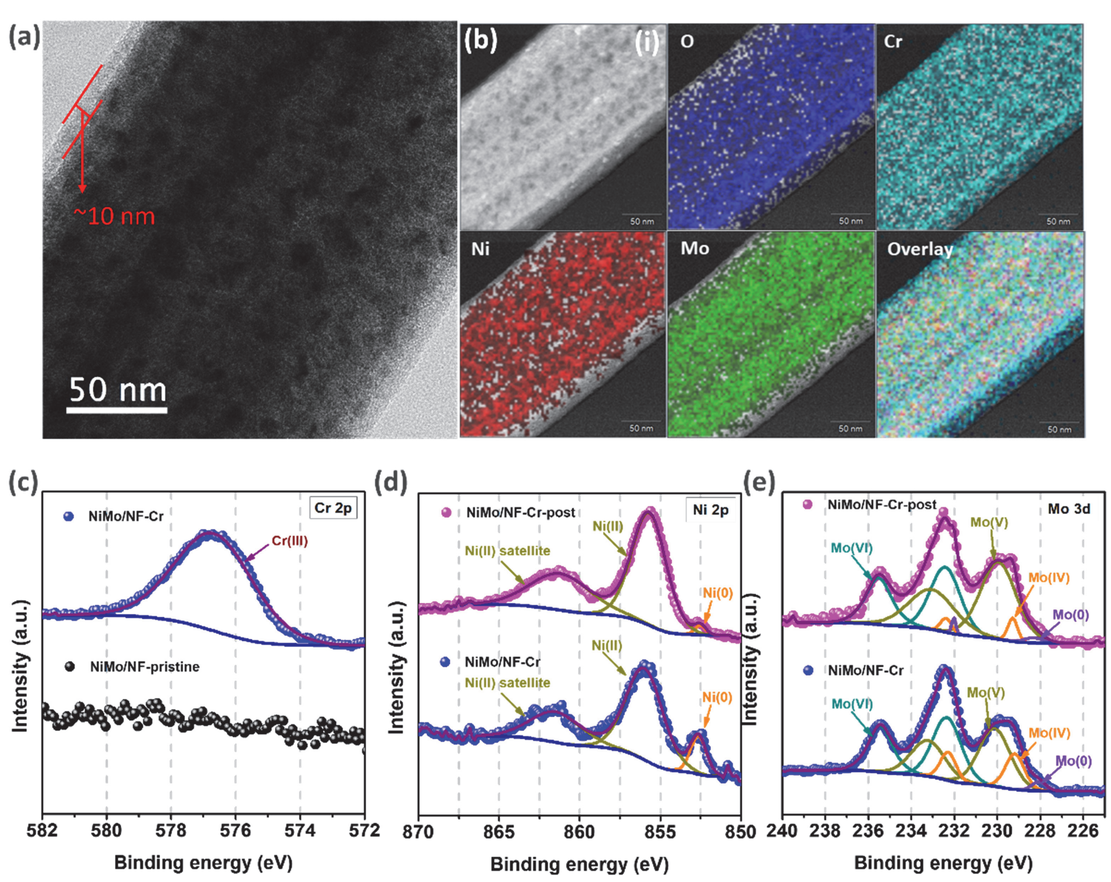
Oxidation of NiMo electrodes after intermittent electrolysis



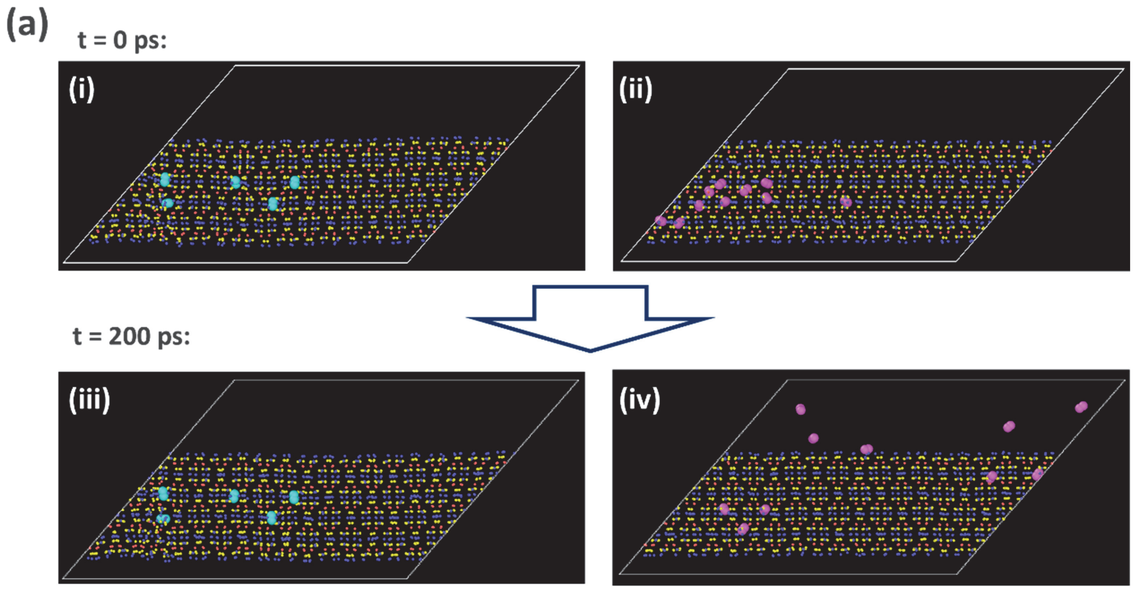
Cr coating for stability enhancement

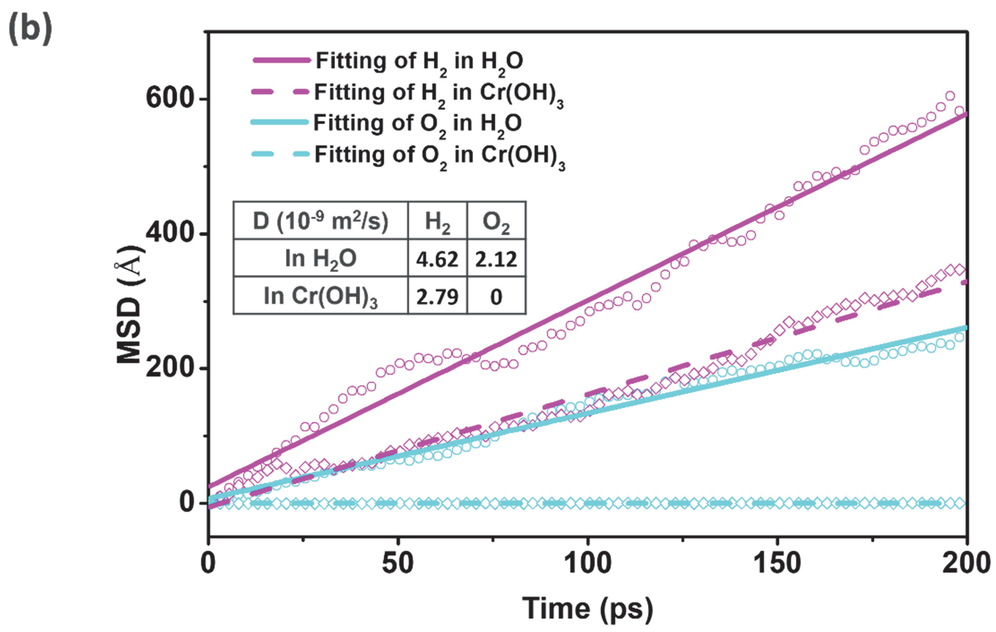


Effect of Cr coating in oxidation prevention



Cr coating as a selective diffusion barrier





ACS Appl. Mater. Interfaces 2022, 14, 36, 40822−40833