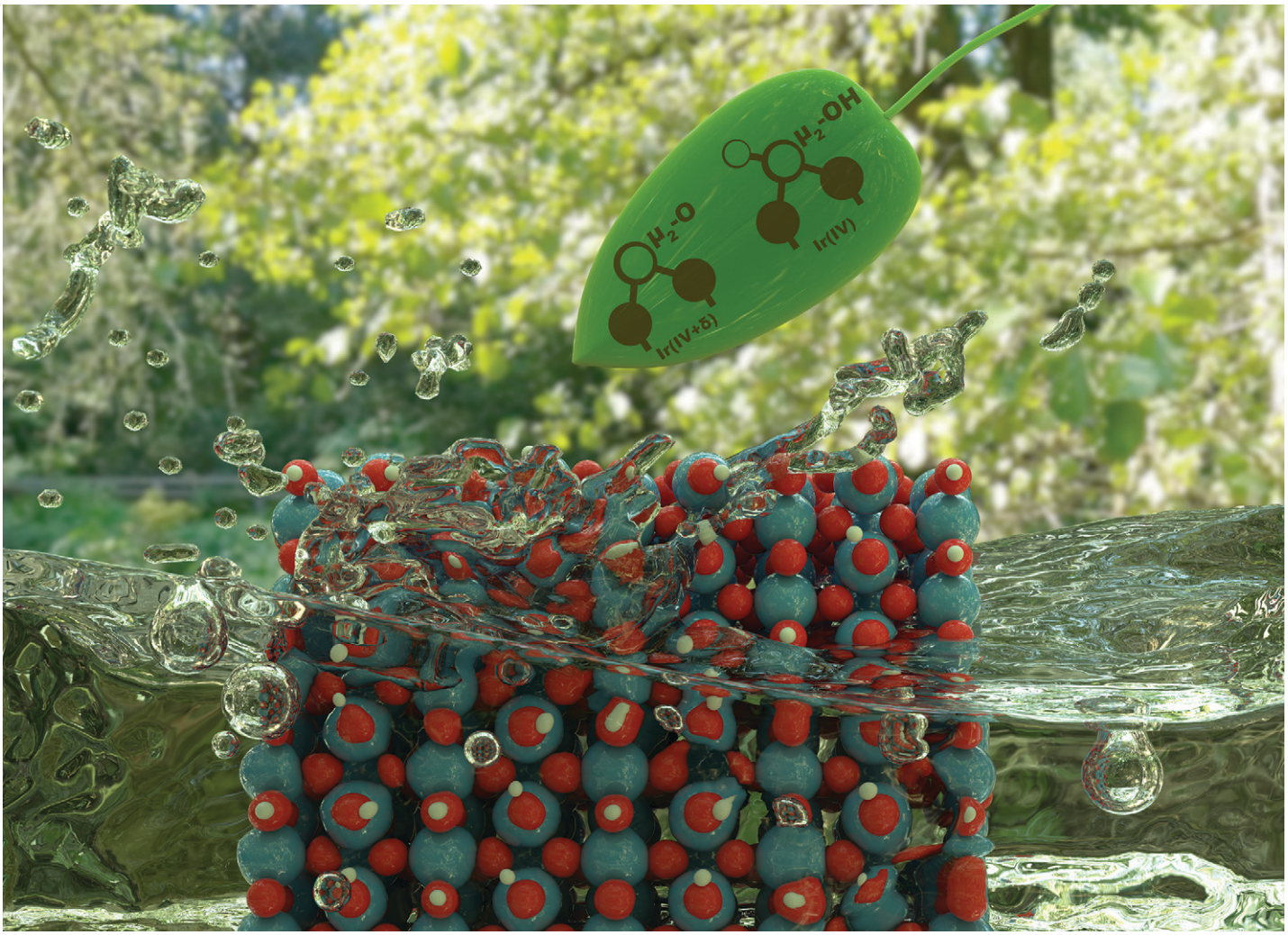

Showcasing research from the inorganic chemistry department of the Fritz-Haber-Institut der Max-Planck-Gesellschaft and Helmholtz-Zentrum Berlin für Materialien und Energie joint group, Catalysis for energy.

Thermal synthesis of electron deficient oxygen species on crystalline IrO_2

Using *ab initio* thermodynamics and *in situ* X-ray photoelectron and absorption spectroscopies we show that the electrophilic O^{I-} that grows on Ir-based oxides under OER forms on $Ir^{IV+\delta}$ by thermal oxidation of rutile-type IrO_2, without the appearance of unstable Ir^{III} species. CO titration experiments confirm the chemical nature of the thermally grown μ_2-O species, showing they have the same spectroscopic and chemical properties associated with the electrophilic O^{I-} species whose coverage is related to OER activity of Ir-based materials. These findings could offer a route to higher-performance stable OER catalysts.

As featured in:

See E. A. Carbonio, T. Jones *et al.*, *Catal. Sci. Technol.*, 2024, **14**, 572.

ROYAL SOCIETY OF CHEMISTRY

rsc.li/catalysis

Registered charity number: 207890