



National Physical Laboratory

Electrochem Test

Name of the infrastructure / laboratory

Electrochemical techniques for characterisation of catalyst performance

Address and country of the infrastructure / laboratory

National Physical Laboratory, Hampton Road, Teddington, Middlesex, TW11 0LW, United Kingdom

Person responsible of the access / Contact person

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Main field of activity of the infrastructure / laboratory

► Electrochemical characterization of fuel cell catalysts

Short description of the infrastructure / laboratory

NPL has extensive facilities for electrochemical characterisation of fuel cell catalysts, including state of the art scanning electrochemical microscopy (SECM) and rotating disk electrode (RDE). SECM enables the characterisation of electrocatalyst materials through mapping of surface reactivity under relevant aqueous environments. Conventionally a microelectrode probe is scanned at a fixed distance from the substrate and electrolytic processes are driven and monitored locally by the probe to detect spatial variations in catalyst behaviour and activity. In the simplest case the activity of a catalyst sample towards the hydrogen oxidation reaction can be probed in acidic electrolytes, but the experiment can be tailored to a range of reactive systems (e.g. oxygen reduction reaction) and conditions (e.g. pH, solvent medium). Spatial resolution is typically of the order of microns across scanning areas as large as several millimetres. Information about electrochemical kinetics is also obtainable through probe approach curves at points of interest. RDE experiments can be undertaken to gain kinetic information about electrocatalytic processes by lifting mass transport limitations. Typically catalyst particles are immobilized onto a carbon RDE substrate and electrocatalytic activity with respect to the hydrogen oxidation and oxygen reduction reactions is measured through linear sweep and potential step measurements under controlled conditions.

Main research area(s) of the infrastructure / laboratory

Development of nanoscale electrochemical probes

Instruments and tools available for the above mentioned research

Scanning electrochemical microscope with high resolution, rotating disk electrode.

