

ProboStat™

Versatile High Temperature Test Fixture

ProboStat™ is a test fixture for measurements of electrical properties, transport parameters, kinetics of materials, solid/gas interfaces and electrodes at high temperatures under controlled atmospheres



Main features:

Temperature: RT-1600°C

Atmosphere: Oxidizing, inert, reducing, corrosive; wet or dry
Low vacuum 10^{-2} mbar to atmospheric pressure (15 bar optional)
Single or dual chamber modes

Sample: 10-24 mm diameter disk
25-50 mm long bar

Hot zone parts: Alumina and noble metals

Materials properties measured and applicable methods

- Conductivity vs T, pO_2 , pH_2O , etc.
- DC, AC, impedance spectroscopy
- Dielectric properties, loss, etc.
- Disk, van der Pauw, and bar geometries
- 2, 3, and 4 electrodes
- Ionic transport number
- Proton transport number
- H/D isotope effects
- Seebeck coefficient
- I-V-characteristics
- Fuel cell components and single cell testing
- Electrode kinetics
- Electrochemical pumping, gas permeation and electrocatalysis with gas analysis (e.g. GC or MS) on outlets
- Sensor testing
- Poling of ferroelectrics possible with the high-voltage (kV) version
- Annealing or sintering under controlled atmospheres

NORECS products

Measurement Systems

ProboStat™ Versatile sample holder system for measurements of electrical properties, transport parameters, kinetics of materials, solid/gas interfaces and electrodes at high temperatures under controlled atmospheres.

SeebSys System for automated measurements of Seebeck coefficient and electrical resistance at high temperatures and under controlled atmospheres. Measurement software included.

CoulTCell Coulometric titration setup for measurements of oxygen nonstoichiometry of materials at high temperatures in different partial pressure of oxygen. Measurement software included.

Tubular membranes and electrolytes for ProboStat™ Use standard ProboStat™ for tubular gas separation membranes or electrolyte cells. Catalytic Membrane Reactor (CMR) for tubular membranes with CMR-modified ProboStat™.

Software

Omega Multipurpose measurement and data analysis software for electrochemical measurements. Omega is designed for maximum flexibility: it accepts data from many different sources such as instruments, furnaces and mass flow controllers. It can plot any measured or calculated data. With no time restrictions nor limit for simultaneous measurements. It was originally developed for ProboStat™ users.

Omega Temp Software to control and program furnace temperatures and profiles, with unlimited number of segments.

Atmosphere control

ProGasMix FC Versatile rotameter-based manual gas mixer especially developed for laboratory investigations of the properties of oxides at high temperatures vs T, pO₂, pH₂O etc., or fuel cell tests with humidification of fuel and/or oxidant. Partial pressures are calculated via accompany software. Allows measurements of proton and oxide ion transport numbers separately.

FCMix Simple and low-cost gas mixer that controls the flows of fuel, oxidant and one inert gas that can be routed to the fuel and oxidant for flushing, soft start, slow SOFC anode reduction, and safe operation, as well as tests of gas diffusion limitations.

Probble A combined humidification unit and over-pressure controller suitable for small gas flows to SOFC button cell testing (in for example ProboStat™), annealing furnaces, etc. Two units used with FCMix give combined humidification and overpressure control of each ProboStat™ cell chamber as well as fine pressure control in and between two cell chambers.

We supply

Furnaces Furnaces customized for ProboStat™

TempBox Simple thermocouple reader with USB port.

Samples and PLD targets 8YSZ, BZYNi, BZY, etc.

SOFC button cells Anode supported cells with 8YSZ electrolyte, porous nickel cermet anode and lanthanum cobaltite cathode.