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Which SOFC Test System is Right for You?

This brief addresses the strengths of the three SOFC test systems offered by fuelcellmaterials.com in order to guide you in your purchase decision.

The Probostat™ is a multi-purpose, high temperature electrochemical and electrical test fixture. The system uses high alumina construction with platinum leads and type S thermocouples for up to 1600°C operations or type K for up to 1200°C operations. The "Normal" system is configured for 2, 3, or 4-point testing through the thickness of disk shaped fuel cells and other membrane or electrical materials. A key benefit for the Probostat is its unique active and passive shielding schemes that allow for reliable measurements at very AC high frequencies. Optional accessories are available for measuring bulk and surface conductivity (2- or 4-point), Seebeck (thermoelectric) effect, measurements on high temperature liquids, combined optical/electrochemical tests, and more. For fuel cells, the Probostat is ideal for measurement of material properties in both short- and long-term experiments.

The 5x5 cm² test fixture is designed to be utilized mainly for materials testing over larger scale samples. Whereas the Probostat uses ca. 20 mm disks, this fixture can be used to measure one or two cells with active areas up to 25 cm². It is also useful for evaluations of seal materials. Currently it is fabricated from 410 stainless (cell plates) and 304 stainless (gas feed tubes), but other metals are being investigated and customer chosen metals can be considered.

The 28 cm² test fixture is designed for engineering evaluation of complete cells, seals and interconnection schemes. It has internal manifolding to provide a reproducible gas entry temperature. Uniquely designed flow fields provide uniformity of flow across the width of the cell (in contrast to the 5x5 cm² which has simplistic serpentine flows). Thus the 28cm² fixture is ideal for measurement of fuel utilization and temperature change (ΔT) in the flow direction. The test plates are fabricated from Crofer22APU and the feed tubes are from a proprietary low-chrome material. These materials have shown excellent stability and thus the 28cm² is excellent for long-term testing under widely varying fuel conditions as has been demonstrated by NexTech Materials, Ltd.