NEW

BEL JAPAN, INC.

Evaluation and Deterioration System for Flat Plate Single Cell in SOFC

BEL-SOFC

► Evaluation and deterioration test for single cell

(I-V, OCP and impedance measurement of Overall cell as well as each electrode by combination with the electrochemical instruments)

► Full automatic system by dedicated software

(Only setting of experimental conditions (temp/ total Flow amount/ gas ratio for anode and cathode)

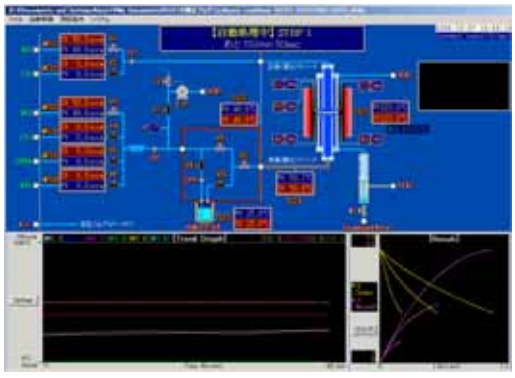
► Easy handling by support software

(Prevention from error in operation by operator)

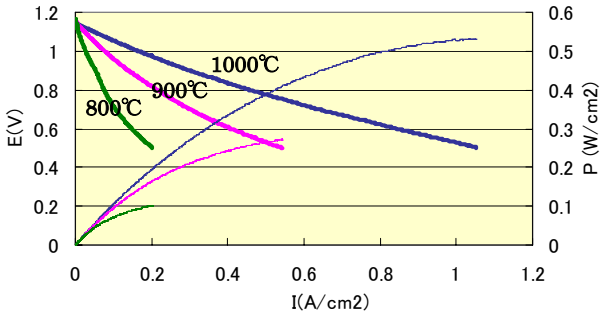
● **BEL-SOFC is the automatic evaluation and deterioration test system for single plate cell in SOFC. Simple sample setting and exchanging achieves by original reactor.**

● **Impedance, OCP and I-V measurements are controlled by dedicated software and electrochemical instrument, also the data is saved automatically. Support software is incorporated and prevents from the error in complicated operation.**

● **Standard cell (Ni-YSZ |YSZ |LSM dia.: approx. φ20mm) is prepared and useful to investigate the various performances and to compare with your cell.**



Software Window



Comparison with the cell performance.(800℃・900℃・1000℃)

Standard Cell: Ni-YSZ |YSZ |LSM Anode: H2＋H2O(278K) cathode: O2

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BEL - SOFC Specification

Sample	Single flat plate (dia.: approx. φ20mm) *Other diameters are negotiable	
Gases	H2, O2, N2, CH4, CO, saturated water vapor Anode Mixture of H2, N2,CH4,CO and saturated water vapor (*saturated water vapor is produced by supplying above mixture gas to bubbler.) Each MFC spec. F.S.200sccm、control range: 2-100%F.S., accuracy: ±2% of F.S. Cathode Mixture of O2 and N2 Each MFC spec. F.S.200sccm、control range: 2-100%F.S., accuracy: ±2% of F.S.	
Humidity Control	Bubbling method(5-80℃) Tank : 250ml (full) Bubbling temperature : 5-80℃ (Temperature control accuracy within ±0.2℃) Relative humidity : saturated humidity will be variable by bubbling temperature change. *Depends on the mixture gases are bubbled into the tank or not.	
Temperature Control	Electrical heating furnace : 400-1000℃ (accuracy: ±0.5℃) ; TIC1 max1200℃ Air thermostatic chamber : 40-100℃ (accuracy: ±0.5℃) ; TIC2 max120℃ Bubbling + BEL-thermo : 5-80℃ (accuracy: ±0.2℃) ; TIC3 max80℃ Heater flexibility : 50-100℃ (accuracy: ±0.5℃) ; TIC4 max120℃	
Pressure	100kPa (Abs) ・Diaphragm pump is used for substitution of gases in the case of the gas cylinder changing and liquid water re-filled. (achieving vacuum : approx.350Pa)	
Material	SUS, Brass, FKM, PEEK, Gold, Platinum, ceramic SSA-S・HB tube	
Electrochemical evaluation method	Impedance measurement and I-V measurement by 3 terminal (Each electrode case) and 4 terminal pole (overall cell case) ＊Electrochemical indicator will be chosen by negotiation.	
Condenser	Set 15℃ by circulation water bath	
Safety feature	Short circuit breaker, lowering water level alarm, hydrogen detection alarm, CO detection alarm, Methane detection alarm TIC1- temperature highest limit alarm (heater OFF), Heater disconnection alarm (only for TIC1)	
Automatic measurement software	Condition setting : Measurement sequence setting (Temp.・flow・time), Synchronism between the sequence setting and impedance measurement and I-V measurement. Saving format : CSV file Display : Flow chart/TIC1-4, Trend graph of MFC input value/I-V・P result	
Physical	W1100xD600xH1800mm (body: W750xD600xH1425mm) ・150 kg	
Footprint	About 2.0m^2 (W2.0m x D1.0m) (w/o electrochemical indicator)	
Other requirements	Computer	Laptop type (recommended) OS: Windows XP, CPU: Intel Pentium III or higher, GPIB : 1 port Memory: 512MB or higher, Serial port (RS-232C): 2 ports
Utility	Gas	Connection Swagelok joint1/8" (side body) N2 : 2 ports H2 : 1 port O2 : 1 port CH4 : 1 port CO : 1 port
	VENT	Connection Swagelok joint1/8" (back body) Main body : 2 ports Vacuum Pump : 1 port
	Power	Main Unit : single phrase AC100V/20A Circulation water bath : single phrase AC100V/8A CPU : single phrase AC100V/2.5A *Power for electrochemical indicator needs to be prepared.
	Others	Spot welding machine 0.5φ of Pt wire should be weldable

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