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Nomenclature

A	Constant
B	Constant
C_p	Molar specific heat ($\text{kJ kmol}^{-1} \text{K}^{-1}$)
C_{pg}	Specific heat of combustion gas ($\text{kJ kmol}^{-1} \text{K}^{-1}$)
E	Reversible open circuit cell voltage (V)
ex	Molar specific exergy (kJ kmol^{-1})
$\dot{E}x$	Total exergy rate (kW)
F	Faraday's constant
G^0	Gibbs free energy (kJ kmol^{-1})
h	Enthalpy (kJ kmol^{-1})
i	Current density (Amp cm^{-2})
i_0	Exchange current density (Amp cm^{-2})
I	SOFC current (Amp)
\dot{I}	Irreversibility rate (kW)
\dot{m}_g	Mass flow rate of combustion gases (kg s^{-1})
\dot{m}_s	Steam generated (kg s^{-1})
\dot{m}_w	Water flow rate (kg s^{-1})
\dot{n}	Molar flow rate (kmol h^{-1})
n_e	Number of electron
p	Partial pressure of constituent gases (bar)
p_0	Reference pressure (bar)
R	Universal gas constant ($8.3143 \text{ kJ kmol}^{-1} \text{K}^{-1}$)
S	Entropy ($\text{kJ kmol}^{-1} \text{K}^{-1}$)
T	Temperature (K)
V	Actual cell voltage (V)
V_{act}	Activation over-potential (V)
V_{conc}	Concentration overpotential (V)
V_{ohm}	Ohmic overpotential (V)
\dot{W}_{net}	Net power (kW)

X Mole fraction

Greek Letters

β Transfer coefficient

ρ Specific resistivity (ohm cm)

δ Thickness (cm)

η Efficiency (%)

Subscripts

av Average

ch Chemical

g Combustion gases

gen Generator

s Isentropic

tm Thermo-mechanical

Abbreviation

AC Air compressor

AFR Air flow rate

AR Air recuperator

BFP Boiler feed pump

BP Boiler pressure

CC Combined cycle

COND Condenser

CPR Compressor pressure ratio

DE Differential evolution

FC Fuel compressor

FFR Fuel flow rate

FR Fuel recuperator

GA Genetic algorithm

GT Gas turbine

GTIT Gas turbine inlet temperature

HP	High pressure
IP	Intermediate pressure
LP	Low pressure
OWH	Open water heater
PR	Pre-reformer
SOFC	Solid oxide fuel cell
ST	Steam turbine
STIT	Steam turbine inlet temperature
TER	Turbine expansion ratio