

Sustainable Development of Renewable Energy

Opportunities in Production, Storage, and Integration

VOLUME 2



Edited by
Mejdi Jeguirim



Advances in Renewable Energy Technologies

Sustainable Development of Renewable Energy

Volume 2 – Opportunities in Production,
Storage, and Integration

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Utilization of landfill and industrial waste gases in solid oxide fuel cells: challenges and perspectives

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List of abbreviations and denotations

3YSZ, 8YSZ	3 and 8 mol.% Y ₂ O ₃ -stabilized ZrO ₂
6ScSZ	6 mol.% Sc ₂ O ₃ -stabilized ZrO ₂
10Sc1CeSZ	10 mol.% Sc ₂ O ₃ and 1 mol.% Y ₂ O ₃ co-stabilized ZrO ₂
10Sc1YSZ	10 mol.% Y ₂ O ₃ and 1 mol.% Y ₂ O ₃ co-stabilized ZrO ₂
CHP	Combined heat and power
CMM	Coal mine methane
COG	Coke oven gas
D4	Octamethylcyclotetrasiloxane
D5	Decamethylcyclopentasiloxane
DSC	double-sided cathode
EDS	Energy dispersive spectroscopy
FESEM	Field emission scanning electron microscopy
FINEX	Process based on the direct use of iron ore fines and non-coking coal
GDC	Gadolinia-doped ceria
GDC10, GDC20	Ce _{0.9} Gd _{0.1} O _{1.95} , Ce _{0.8} Gd _{0.2} O _{1.9}
GT	Gas turbine
ICE	Reciprocating internal combustion engine
IIR	Indirect Internal Reforming
LHV	lower heating value
LNG	Liquefied natural gas
LOHC	Liquid organic hydrogen carrier
LPG	Liquefied petroleum gas
LSC	(La,Sr)CoO _{3-δ}
LSCF	(La,Sr)(Fe,Co)O _{3-δ}
LSM	(La,Sr) _{1-x} MnO _{3-δ}
MCFCs	Molten carbonate fuel cells
MEA	Membrane-electrode assembly
MSW	Municipal solid waste
OCV	Open circuit voltage
ScSZ	Sc ₂ O ₃ -stabilized ZrO ₂
SDC15, SDC20	Ce _{0.85} Sm _{0.15} O _{1.925} , Ce _{0.8} Sm _{0.2} O _{1.9}