

**Studies on Hydrogen Production by Steam
Reforming of Acetic acid on MOFs derived Nickel
Catalysts for Utilization of Biomass**

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SUBMITTED BY

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UNDER THE SUPERVISION OF

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I would like to dedicate this dissertation to
my family who has
supported and encouraged me throughout
this endeavour: thank you
for your love and support throughout my
entire life and helping me
realize who I am today!



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List of Symbols

AcOH	Acetic acid
Dp	Crystallite size, nm
dp	Pore diameter
D	Crystalline lattice size
Ni(0)	Metallic nickel
T	Temperature, °C
Wt.	Weight of catalyst, g
Wt %	Weight percentage
XAcOH (%)	Acetic acid conversion
X _{C-C}	Carbon conversion
Y	Yield

List of Abbreviations

AASR	Acetic acid steam reforming
AcOH	Acetic acid
ALC	$\text{Al}_2\text{O}_3/\text{La}_2\text{O}_3/\text{CeO}_2$
$\gamma\text{-Al}_2\text{O}_3$	Gamma Alumina
APR	Aqueous phase reforming
BET	Brunauer-Emmet-Teller
C	Carbon/Coke
CeO_2	Cerium oxide
CO	Carbon monoxide
CO_2	Carbon die oxide
Comp	Complex
CH_4	Methane
DT-TGA	Differential thermal, Thermal gravimetric
EDAX	Energy dispersive Xray-analysis
TCD	Thermal Conductive Detector
FID	Flame Ionization Detector
GC	Gas Chromatography
H_2	Hydrogen
La_2O_3	Lanthanum oxide
MOFs	Metal Organic Frameworks

Ni	Nickel
Ni-complex	(Ni[bpy] ₂ Cl ₂)
OSR	Oxidative steam reforming
POX	Partial oxidation
RPM	Round per minute
RWGS	Reverse water gas shift reaction
S/C	Steam to carbon molar ratio
SEM	Scanning Electron Microscopy
TEM	Transmission Electron Microscopy
TPR	Temperature Programme Reduction
WGS	Water gas shift Reaction
WHSV	Weight hour space velocity
XPS	Xray-Photoelectron Spectroscopy
XRD	Xray-Diffraction analysis