



Funded by the
European Union

BRAVA



The project is supported by the Clean Hydrogen Partnership and its members Hydrogen Europe and Hydrogen Europe Research

Clean Hydrogen Project BRAVA No. 101101409

WP4.1 - Deliverable D4.1 – Report Catalyst and catalyst support R&D report 1



Deliverable Details

Deliverable No.	D4.1
Related WP	WP4
Deliverable Title	Catalyst and catalyst support R&D report 1
Deliverable Date	30.11.2023
Deliverable Type	REPORT
Dissemination level	Sensitive – member only (SEN)
Author(s) and contributors	TUB – Peter Strasser, An Guo, Raffaele Amitrano, Mathias Primbs
Checked by	WP Leader: Hubert Meissel
Final approval	Dirk Kastell

Change History

Version	Date	Changes	Done by	Approved by
V1	10.11.2023	First Version	TUB	Dirk Kastell



List of Acronyms and Abbreviations

Abbr.	Description	Abbr.	Description
AST	Accelerated Stress Test	OCV	Open Circuit Voltage
at%	Atomic Percentage	ORR	Oxygen Reduction Reaction
bpy	Bipyridine	PEIS	Potentiostatic Electrochemical Impedance Spectroscopy
CCM	Catalytic Coated Membrane	PEM	Proton Exchange Membrane
CL	Catalyst Layer(s)	PEMFC	Proton Exchange Membrane Fuel Cell
ECSA	Electrochemically Active Surface Area	RDE	Rotating Disc Electrode
FC	Fuel Cell	SA	Specific Activity
GC	Glassy Carbon	TBD	To Be Determined
Hupd	Hydrogen under potential deposition	TEM	Transmission Electron Microscopy
ICP-OES	Inductively Coupled Plasma Optical Emission Spectroscopy	TF	Tube Furnace
MA	Mass Activity	WE	Working Electrode
MEA	Membrane Electrode Assembly	wt%	Weight Percentage
MTF	Movable Tube Furnace	XRD	X-Ray Diffraction
N/A	Not Applicable		



1. Executive Public Summary

This deliverable report D4.1 is a status update on the work done in WP “Stack Technology Development” on the subtask WP4.1 “Catalyst Development” from M1 to M11 done by TUB. The carried-out work covers the definition of requirements on the catalyst and support, finding suitable synthesis methods and carrying out synthesis and characterizations of newly developed catalyst systems and evaluating their suitability for scale up in WP4.1.2 and their use in aviation fuel cells. Multiple synthesis methods for high loading PtCo intermetallic candidates with promising properties were found and optimized.



Acknowledgments

The author(s) would like to thank the partners in the project for their valuable comments on previous drafts and for performing the review.

Project partners:

#	Partner short name	Partner Full Name
1	A-D	AIRBUS OPERATIONS GMBH
2	A-E	AIRBUS OPERATIONS SL
3	AER	AEROSTACK GMBH
4	CNRS	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
4.1	UM	UNIVERSITÉ DE MONTPELLIER
5	HER	HERAEUS DEUTSCHLAND GMBH & CO KG
6	LTS	LIEBHERR AEROSPACE TOULOUSE SAS
7	MAD	MADIT METAL S.L.
8	MOR	MORPHEUS DESIGNS S.L.
9	NLR	STICHTING KONINKLIJK NEDERLANDS LUCHT – EN RUIJTEVAARTCENTRUM
10	SOL	SOLVAY SPECIALTY POLYMERS ITALY SPA
10.1	RHOP	RHODIA OPERATIONS
10.2	RHLA	RHODIA LABORATOIRE DU FUTUR
11	TUB	TECHNISCHE UNIVERSITÄT BERLIN

This document or any part thereof may not be made public or disclosed, copied or otherwise reproduced or used in any form or by any means, without prior permission in writing from the BRAVA Consortium. Neither the BRAVA Consortium nor any of its members, their officers, employees or agents shall be liable or responsible, in negligence or otherwise, for any loss, damage or expense whatever sustained by any person as a result of the use, in any manner or form, of any knowledge, information or data contained in this document, or due to any inaccuracy, omission or error therein contained.

All Intellectual Property Rights, know-how and information provided by and/or arising from this document, such as designs, documentation, as well as preparatory material in that regard, is and shall remain the exclusive property of the BRAVA Consortium and any of its members or its licensors. Nothing contained in this document shall give, or shall be construed as giving, any right, title, ownership, interest, license or any other right in or to any IP, know-how and information.

This project has received funding from the European Union's Horizon Europe research and innovation program under grant agreement No 101101409. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or Clean Hydrogen Joint Undertaking. Neither the European Union nor the granting authority can be held responsible for them.

