Department of Functional Materials
Faculty of Engineering Science, University of Bayreuth
Prof. Dr.-Ing. Ralf Moos

as of August 10, 2023

Articles on Powder Aerosol Deposition Method (PAD), a.k.a. ADM

Progress report

J. Exner, T. Nazarenus, D. Hanft, J. Kita, R. Moos:
What Happens during Thermal Post-Treatment of Powder Aerosol Deposited Functional Ceramic Films? Explanations Based on an Experiment-Enhanced Literature Survey
open access - free *Advanced Materials*, **32**, 1908104 (2020), doi: 10.1002/adma.201908104

Overview articles

M. Schubert, D. Hanft, T. Nazarenus, J. Exner, M. Schubert, P. Nieke, P. Glosse, N. Leupold, J. Kita, R. Moos:
Powder aerosol deposition method — novel applications in the field of sensing and energy technology
open access - free *Functional Materials Letters*, **12**, 1930005 (2019), doi: 10.1142/S1793604719300056

D. Hanft, J. Exner, M. Schubert, T. Stöcker, P. Fuierer, R. Moos:
An Overview of the Aerosol Deposition Method: Process Fundamentals and New Trends in Materials Applications
open access - free *Journal of Ceramic Science and Technology*, **6**, 147-182 (2015), doi: 10.4416/JCST2015-00018

Regular peer-reviewed articles

S. Biberger, N. Leupold, C. Witt, C. Greve, P. Markus, P. Ramming, D. Lukas, K. Schötz, F.-J. Kahle, C. Zhu, G. Papastavrou, A. Köhler, E.M. Herzig, R. Moos, F. Panzer:
First of Their Kind: Solar Cells with a Dry-Processed Perovskite Absorber Layer via Powder Aerosol Deposition and Hot-Pressing
open access - free *Solar RRL*, in press, doi: 10.1002/solr.202300261, https://doi.org/10.1002/solr.202300261

T. Nazarenus, J. Schneider, L. Hennerici, R. Moos, J. Kita:
Energy estimation of the post-treatment process for powder aerosol deposited solid electrolyte films
Functional Materials Letters, **16**, 2350014 (2023), doi: 10.1142/S1793604723500145

M. Sozak, T. Nazarenus, J. Exner, J. Kita, R. Moos:
Room temperature manufacture of dense NaSICON solid electrolyte films for all-solid-state-sodium batteries
open access - free *Journal of Materials Science*, **58**, 10108-10119 (2023), doi: 10.1007/s10853-023-08642-w

U. Eckstein, J. Exner, A. Bencan Golob, K. Ziberna, G. Drazic, H. Ursic, H. Wittkämper, C. Papp, J. Kita, R. Moos, K.G. Webber, N.H. Khansur:
Temperature-dependent dielectric anomalies in powder aerosol deposited ferroelectric ceramic films
open access - free *Journal of Materiomics*, **8**, 1239-1250 (2022), doi: 10.1016/j.jmat.2022.05.001

T. Nazarenus, K. Schlesier, F. Lebeda, M. Retsch, R. Moos:
Microstrain release decouples electronic and thermal conductivity in powder aerosol deposited films
Materials Letters, **322**, 132461 (2022), doi: 10.1016/j.matlet.2022.132461

R. Werner, J.S. Matejka, D. Schönauer-Kamin, R. Moos:
From Thermoelectric Powder Directly to Thermoelectric Generators: Flexible Bi_2Te_3 Films on Polymer Sheets Prepared by the Powder Aerosol Deposition Method at Room Temperature
open access - free *Energy Technology*, **10**, 2101091 (2022), doi: 10.1002/ente.202101091

M. Linz, J. Exner, T. Nazarenus, J. Kita, R. Moos:
Mobile sealing and repairing of damaged ceramic coatings by powder aerosol deposition at room temperature
open access - free *Open Ceramics*, **10**, 100253 (2022), doi: 10.1016/j.oceram.2022.100253

T. Nazarenus, K. Schlesier, S. Biberger, J. Exner, J. Kita, A. Köhler, R. Moos:
Posttreatment of powder aerosol deposited oxide ceramic films by high power LED
open access - free *International Journal of Applied Ceramic Technology*, **19**, 1540-1553 (2022), doi: 10.1111/ijac.13977

T. Nazarenus, Y. Sun, J. Exner, J. Kita, R. Moos:
Powder Aerosol Deposition as a Method to Produce Garnet-Type Solid Ceramic Electrolytes: A Study on Electrochemical Film Properties and Industrial Application
open access - free *Energy Technology*, **9**, 2100211 (2021), doi: 10.1002/ente.202100211

J. Exner, M. Linz, J. Kita, R. Moos:
Making powder aerosol deposition accessible for small amounts: A novel and modular approach to produce dense ceramic films
open access - free *International Journal of Applied Ceramic Technology*, **18**, 2178-2196 (2021), doi: 10.1111/ijac.13841

M. Linz, J. Exner, J. Kita, F. Bühner, M. Seipenbusch, R. Moos:
Discontinuous Powder Aerosol Deposition: An Approach to Prepare Films Using Smallest Powder Quantities
open access - free *Coatings*, **11**, 844 (2021), doi: 10.3390/coatings11070844

P. Glosse, S. Denneler, O. Stier, R. Moos:
Investigation of the Powder Aerosol Deposition Method Using Shadowgraph Imaging
open access - free *Materials*, **14**, 2502 (2021), doi: 10.3390/ma14102502

N. Leupold, S. Denneler, G. Rieger, R. Moos:
Powder Treatment for Increased Thickness of Iron Coatings Produced by the Powder Aerosol Deposition Method and Formation of Iron–Alumina Multilayer Structures
open access - free *Journal of Thermal Spray Technology*, **30**, 480-487 (2021), doi: 10.1007/s11666-020-01098-3

T. Nazarenus, J. Kita, R. Moos, J. Exner:
Laser-Annealing of Thermoelectric $CuFe_{0.98}Sn_{0.02}O_2$ Films Produced by Powder Aerosol Deposition Method
open access - free *Advanced Materials Interfaces*, **7**, 2001114 (2020), doi: 10.1002/admi.202001114

J. Exner, T. Nazarenus, J. Kita, R. Moos:
Dense Y-doped ion conducting perovskite films of $BaZrO_3$, $BaSnO_3$, and $BaCeO_3$ for SOFC applications produced by powder aerosol deposition at room temperature
International Journal of Hydrogen Energy, **45**, 10000-10016 (2020), doi: 10.1016/j.ijhydene.2020.01.164

J. Exner, J. Kita, R. Moos:
In- and through-plane conductivity of 8YSZ films produced at room temperature by aerosol deposition
Journal of Materials Science, **54**, 13619-13634 (2019), doi: 10.1007/s10853-019-03844-7

M. Schubert, J. Kita, C. Münch, R. Moos:
Investigation of the in situ calcination of aerosol co-deposited NiO-Mn_2O_3 films
Functional Materials Letters, **12**, 1950039 (2019), doi: 10.1142/S1793604719500395

M. Schubert, C. Münch, S. Schuurman, V. Poulain, J. Kita, R. Moos:
Novel Method for NTC Thermistor Production by Aerosol Co-Deposition and Combined Sintering
open access - free *Sensors*, **19**, 1632 (2019), doi: 10.3390/s19071632

M. Schubert, N. Leupold, J. Kita, R. Moos:
Oxygen partial pressure dependency of the electrical conductivity of aerosol deposited alumina films between 650 °C and 900 °C
Materials Letters, **245**, 208-210 (2019), doi: 10.1016/j.matlet.2019.02.094

P. Nieke, J. Kita, M. Häming, R. Moos:
Manufacturing Dense Thick Films of Lunar Regolith Simulant EAC-1 at Room Temperature
open access - free *Materials*, **12**, 487 (2019), doi: 10.3390/ma12030487

J. Exner, M. Schubert, D. Hanft, J. Kita, R. Moos:
How to treat powders for the room temperature aerosol deposition method to avoid porous, low strength ceramic films
Journal of the European Ceramic Society, **39**, 592-600 (2019), doi: 10.1016/j.jeurceramsoc.2018.08.008

M. Schubert, C. Münch, S. Schuurman, V. Poulain, J. Kita, R. Moos:
Thermal Treatment of Aerosol Deposited $NiMn_2O_4$ NTC Thermistors for Improved Aging Stability
open access - free *Sensors*, **18**, 3982 (2018), doi: 10.3390/s18113982

J. Exner, H. Pöpke, F.-M. Fuchs, J. Kita, R. Moos:
Annealing of Gadolinium-Doped Ceria (GDC) Films Produced by the Aerosol Deposition Method
open access - free *Materials*, **11**, 2072 (2018), doi: 10.3390/ma11112072

D. Hanft, P. Glosse, S. Denneler, T. Berthold, M. Oomen, S. Kauffmann-Weiss, F. Weis, W. Häßler, B. Holzapfel, R. Moos:
The Aerosol Deposition Method: A Modified Aerosol Generation Unit to Improve Coating Quality
open access - free *Materials*, **11**, 1572 (2018), doi: 10.3390/ma11091572

D. Hanft, M. Bektas, R. Moos:
Powder pre-treatment for aerosol deposition of tin dioxide coatings for gas sensors
open access - free *Materials*, **11**, 1342 (2018), doi: 10.3390/ma11081342

M. Schubert, N. Leupold, J. Exner, J. Kita, R. Moos:
High-Temperature Electrical Insulation Behavior of Alumina Films Prepared at Room Temperature by Aerosol Deposition and Influence of Annealing Process and Powder Impurities
Journal of Thermal Spray Technology, **27**, 870-879 (2018), doi: 10.1007/s11666-018-0719-x

N. Leupold, M. Schubert, J. Kita, R. Moos:
Influence of high temperature annealing on the dielectric properties of alumina films prepared by the aerosol deposition method
Functional Materials Letters, **11**, 1850022 (2018), doi: 10.1142/S1793604718500224

M. Schubert, C. Münch, S. Schuurman, V. Poulain, J. Kita, R. Moos:
Characterization of Nickel Manganite NTC thermistor films prepared by Aerosol Deposition at room temperature
Journal of the European Ceramic Society, **38**, 613-619 (2018), doi: 10.1016/j.jeurceramsoc.2017.09.005

M. Schubert, J. Kita, C. Münch, R. Moos:
Analysis of the characteristics of thick-film NTC thermistor devices manufactured by screen-printing and firing technique and by room temperature aerosol deposition method (ADM)
Functional Materials Letters, **10**, 1750073 (2017), doi: 10.1142/S1793604717500734

M. Schubert, M. Hahn, J. Exner, J. Kita, R. Moos:

Effect of substrate hardness and surface roughness on the film formation of aerosol-deposited ceramic films
Functional Materials Letters, **10**, 1750045 (2017), doi: 10.1142/S179360471750045X

D. Hanft, J. Exner, R. Moos:
Thick-films of garnet-type lithium ion conductor prepared by the Aerosol Deposition Method: The role of morphology and annealing treatment on the ionic conductivity
Journal of Power Sources, **361**, 61-69 (2017), doi: 10.1016/j.jpowsour.2017.06.061

S. Kauffmann-Weiss, W. Hässler, E. Guenther, J. Scheiter, S. Denneler, P. Glosse, T. Berthold, M. Oomen, T. Arndt, T. Stöcker, D. Hanft, R. Moos, M. Weiss, F. Weis, B. Holzapfel:
Superconducting properties of thick films on Hastelloy prepared by the Aerosol Deposition Method with ex-situ MgB_2 powder
IEEE Transactions on Applied Superconductivity, **27**, 6200904 (2017), doi: 10.1109/TASC.2017.2669479

F. Panzer, D. Hanft, T.P. Gujar, F.-J. Kahle, M. Thelakkat, A. Köhler, R. Moos:
Compact Layers of Hybrid Halide Perovskites Fabricated via the Aerosol Deposition Process – Uncoupling Material Synthesis and Layer Formation
open access - free *Materials*, **9**, 277 (2016), doi: 10.3390/ma9040277

T. Stöcker, J. Exner, M. Schubert, M. Streibl, R. Moos:
Influence of Oxygen Partial Pressure during Processing on the Thermoelectric Properties of Aerosol-Deposited $CuFeO_2$
open access - free *Materials*, **9**, 227 (2016), doi: 10.3390/ma9040227

J. Exner, M. Schubert, D. Hanft, T. Stöcker, P. Fuierer, R. Moos:
Tuning of the electrical conductivity of $Sr(Ti,Fe)O_3$ oxygen sensing films by aerosol co-deposition with Al_2O_3
Sensors and Actuators B: Chemical, **230**, 427-433 (2016), doi: 10.1016/j.snb.2016.02.033

J. Exner, M. Hahn, M. Schubert, D. Hanft, P. Fuierer, R. Moos:
Powder requirements for aerosol deposition of alumina films
Advanced Powder Technology, **26**, 1143-1151 (2015), doi: 10.1016/j.apt.2015.05.016

J. Exner, P. Fuierer, R. Moos:
Aerosol Codeposition of Ceramics: Mixtures of Bi_2O_3-TiO_2 and Bi_2O_3-V_2O_5
Journal of the American Ceramic Society, **98**, 717-723 (2015), doi: 10.1111/jace.13364

J. Exner, P. Fuierer, R. Moos:
Aerosol Deposition of (Cu,Ti) substituted Bismuth Vanadate Films
Thin Solid Films, **573**, 185-190 (2014), doi: 10.1016/j.tsf.2014.11.037

M. Bektas, D. Hanft, D. Schönauer-Kamin, T. Stöcker, G. Hagen, R. Moos:
Aerosol-deposited $BaFe_{0.7}Ta_{0.3}O_{3-\delta}$ for nitrogen monoxide and temperature-independent oxygen sensing
open access - free *Journal of Sensors and Sensor Systems*, **3**, 223-229 (2014), doi: 10.5194/jsss-3-223-2014

M. Schubert, J. Exner, R. Moos:
Influence of carrier gas composition on the stress of Al_2O_3 coatings prepared by the Aerosol Deposition Method
open access - free *Materials*, **7**, 5633-5642 (2014), doi: 10.3390/ma7085633

K. Sahner, M. Kaspar, R. Moos:
Assessment of the novel aerosol deposition method for room temperature preparation of metal oxide gas sensor films
Sensors and Actuators B: Chemical, **139**, 394-399 (2009), doi: 10.1016/j.snb.2009.03.011