

Schriftenreihe:

**WERKSTOFFE UND WERKSTOFF-
TECHNISCHE ANWENDUNGEN**



Hrsg.: Univ.-Prof. Dr.-Ing. habil. T. Lampke
Univ.-Prof. Dr.-Ing. G. Wagner
Univ.-Prof. Dr.-Ing. habil. M.F.-X. Wagner

Tagungsband zum
19. Werkstofftechnischen Kolloquium
in Chemnitz

16. und 17. März 2017

Band 61

Inhaltsverzeichnis

Eingeladene Beiträge

Gedruckte Elektronik – Neue Materialien ermöglichen neue Produktionsprozesse <i>A C Hübler</i>	19
Diffusionsschweißen von metallischen Mischverbindungen im Leichtbau – Einfluss der Oberflächenbeschaffenheit <i>P Mayr</i>	20
Recent developments in plasma spray processes for applications in energy technology <i>G Mauer, M O Jarligo, D Marcano, S Rezanka, D Zhou and R Vaßen</i>	21
Herstellung, Eigenschaften und Potenziale aktueller Aluminiumschäume <i>G Lange</i>	32
Wärmebehandlung von hochfesten Aluminiumlegierungen basierend auf der in-situ Charakterisierung von Ausscheidungs- und Auflösungsvorgängen <i>O Keßler</i>	33
Materials combining structure and chemical function – A perspective <i>M Armbrüster</i>	34
Beside all euphoria for A.M. and Industry 4.0 thermal spray remains the burner of technology! <i>K Nassenstein</i>	35
Cold spraying for additive manufacturing and repair <i>T Klassen</i>	36
Rivetless aircraft structures: Possible application of solid-state joining processes <i>J dos Santos</i>	37
Entwicklung von bruchzähem keramischen Werkstoffen und Bauteilen <i>W Krenkel</i>	38
Materials science for making gold <i>S Odenwald</i>	39

Fügen mit Schwerpunkt Solid State Verfahren

- Formation of a diffusion-based intermetallic interface layer in friction stir welded dissimilar Al-Cu lap joints** 43
R Marstatt, M Krutzlinger, J Luderschmid, M F Zaeh and F Haider
- Hybrid Al/steel-joints manufactured by ultrasound enhanced friction stir welding (USE-FSW): Process comparison, nondestructive testing and microscopic analysis** 53
M Thomä, G Wagner, B Straß, B Wolter, S Benfer and W Fürbeth
- Hybrid joints manufactured by ultrasound enhanced friction stir welding (USE-FSW) - corrosion properties** 60
S Benfer, W Fürbeth, M Thomä, G Wagner, B Straß and B Wolter
- Development of a Cu-Sn based brazing system with a low brazing and a high remelting temperature** 68
M Schmieding, U Holländer and K Möhwald
- Investigation of the effect of rapidly solidified braze ribbons on the microstructure of brazed joints** 75
K Bobzin, M Öte, S Wiesner, P Rochala, J Mayer, A Aretz, R Iskandar and A Schwedt
- Feasibility study of fluxless brazing cemented carbides to steel** 85
W Tillmann and N Sievers
- Combustion synthesis of reactive nickel-aluminum particles as an innovative approach for thermal joining applications** 92
S Schreiber, G D Theodossiadis and M F Zaeh

Thermische Beschichtungstechnik

- Laserstrahlheißdrahtbeschichten mit Hartstoffen auf Recyclingbasis** 103
V Wesling, R Reiter, M Hecht, D Beuth, L Lau, B Burchards und G Phochkhua
- Development of Process data capturing, analysis and controlling for thermal spray techniques – Spray Tracker** 111
C Kelber, S Marke, U Trommler, C Rupprecht and S Weis
- Stability of aluminium titanate in APS-sprayed coatings from modified Al₂O₃-40%TiO₂ feedstock powders** 118
L-M Berger, R Vaßen and Y J Sohn

Robot based deposition of WC-Co HVOF coatings on HSS cutting tools as a substitution for solid cemented carbide cutting tools	119
<i>W Tillmann, C Schaak, D Biermann, R Afmuth and S Goeke</i>	
Manufacture of iron-based, amorphous coatings with high fracture toughness	128
<i>K Bobzin, M Öte and T Königstein</i>	
Tailoring the heat transfer on the injection moulding cavity by plasma sprayed ceramic coatings	137
<i>K Bobzin, Ch Hopmann, M Öte, M A Knoch, I Alkhasli, H Dornebusch and M Schmitz</i>	
Entwicklung neuartiger intermetallischer Hartlegierungen zum Verschleißschutz	146
<i>V Westling, R Reiter, S Kamper, L Lau und D Beuth</i>	
<u>Werkstoffprüfung / Ermüdung / Schädigung</u>	
Production integrated nondestructive testing of composite materials and material compounds – an overview	155
<i>B Straß, C Conrad and B Wolter</i>	
3D Scanning Laser Doppler Vibrometer for non-contact defect recognition in composite materials	165
<i>M Fritzsche</i>	
Requirements and testing methods for surfaces of metallic bipolar plates for low-temperature PEM fuel cells	166
<i>P Jendras, K Lötsch and T von Unwerth</i>	
Influence of the post-weld surface treatment on the corrosion resistance of the duplex stainless steel 1.4062	172
<i>P Rosemann, C Müller, O Baumann, W Modersohn and T Halle</i>	
Evolution of adiabatic shear bands in the beta titanium alloy Ti-10V-2Fe-3Al	181
<i>S Winter, M Scholze and M F-X Wagner</i>	
Analysis of the ductility dip cracking in the nickel-base alloy 617mod	182
<i>A Eilers, J Nellesen, R Zielke and W Tillmann</i>	
Dynamic tafel factor adaption for the evaluation of instantaneous corrosion rates on zinc by using gel-type electrolytes	189
<i>M Babutzka and A Heyn</i>	

A numerical and experimental study of temperature effects on deformation behavior of carbon steels at high strain rates 200
M Pouya, S Winter, S Fritsch and M F-X Wagner

Experimental and numerical investigation of the residual yield strength of aluminium alloy EN AW-2024-T3 affected by artificially produced pitting corrosion 207
R Pippig, E Schmidl, P Steinert, A Schubert and T Lampke

An experimental and theoretical study on the effect of Cu interlayers on microstructures of NiTi thin films on graphene substrates 213
S Hahn, A Schulze, M Böhme, T Hahn and M F-X Wagner

Verbundwerkstoffe und Werkstoffverbunde

Punktuelle Magnesium-Aluminium-Verbindungen 217
D Serafinski und R Winkelmann

Investigation of the effect of contaminations and cleaning processes on the surface properties of brazing surfaces 225
K Bobzin, M Öte and S. Wiesner

Investigation on the cold rolling and structuring of cold sprayed copper-coated steel sheets 236
K Bobzin, M Öte, S Wiesner, L Gerdt, S Senge and G Hirt

Löten von Stahl-Kunststoff-Stahl-Verbundwerkstoffen 247
A Kilian und R Winkelmann

Werkstoffe und Werkstoffkombinationen für das punktuelle Verbinden von Aluminium 258
D Krüger, P Schütte und R Winkelmann

Interfacial strength analyses of Al/Mg compounds using bending tests 270
T Lehmann, C Kirbach, J Müller, M Stockmann and J Ihlemann

FE-simulation of the Presta joining process for assembled camshafts – modelling of the joining process 277
R Scherzer, C B Silbermann, R Landgraf and J Ihlemann

A numerical and experimental comparison of test methods for the shear strength in hybrid metal/thermoplastic-compounds 285
E Saborowski, M Scholze, T Lindner and T Lampke

Werkstofftechnik / Wärmebehandlung

- Prediction of phase distribution pattern in phase field simulations on Mo₅SiB₂-primary areas in near eutectic Mo-Si-B alloy** 301
O Kazemi, G Hasemann, M Krüger and T Halle
- Reversed austenite for enhancing ductility of martensitic stainless steel** 308
S Dieck, P Rosemann, A Kromm and T Halle
- Evolution of microstructure and mechanical properties during Q&P processing of medium-carbon steels with different silicon levels** 316
Š Jeníček, I Vorel, J Káňa, K Opatová, K Rubešová, V Kotěšovec and B Mašek

Leichtbauwerkstoffe / Ultrafeinkörnige Materialien

- Localized shear deformation in different α -brass sheets during accumulative roll bonding** 325
M Böhme, P Fritzsche, S Hahn and M F-X Wagner
- Material selection for climbing hardware using the example of a belay device** 326
E Semenov, S Schwanitz and S Odenwald
- Influence of ECAP temperature on the formability of a particle reinforced 2017 aluminum alloy** 333
S Wagner, M Härtel, P Frint and M F-X Wagner
- Small scale mechanical testing of bulk ultrafine-grained laminated structures** 339
P Frint and M F-X Wagner
- Effect of compression shear loading on the deformation behavior of a strongly textured AZ31 magnesium alloy** 340
S Seipp, S Pfeiffer, P Frint, S Roy and M F-X Wagner
- On the effect of natural aging prior to low temperature ECAP of a high-strength aluminum alloy** 341
S Fritsch and M F-X Wagner

Galvanik

- Composition of highly concentrated silicate electrolytes and ultrasound influencing the plasma electrolytic oxidation of magnesium** 345
F Simchen, L-M Rymer, M Sieber and T Lampke

Electrochemical deposition of iridium and iridium-nickel-alloys	358
<i>J Näther, F Köster, R Freudenberger, C Schöberl and T Lampke</i>	
Localised anodic oxidation of aluminium material using a continuous electrolyte jet	365
<i>D Kuhn, A Martin, C Eckart, M Sieber, R Morgenstern, M Hackert-Oschätzchen, T Lampke and A Schubert</i>	
Influence of the heat treatment condition of alloy AlCu4Mg1 on the microstructure and properties of anodic oxide layers	374
<i>R Morgenstern, D Dietrich, M Sieber and T Lampke</i>	
Automatisiertes Mess- und AnalyseSystem zur online Ermittlung der Stromdichte in Galvanikbädern mit gesteuerten Aktoren zur effektiveren Herstellung homogener Schichtdicken (AMAS)	381
<i>H Klemnow und P Pröfrock</i>	
Numerical design of electrolytes for electrodeposition of alloys	391
<i>M Müller, I Scharf, E Schmidl and D Höhlich</i>	
<u>Posterbeiträge</u>	
Interfacial microstructure and mechanical properties of brazed aluminum / stainless steel - joints	395
<i>V Fedorov, M Elßner, T Uhlig and G Wagner</i>	
Entwicklung von HT-Lotsystemen für artfremde Werkstoffverbunde: Nimonic 75 – 16Mo3	401
<i>R Blank, I Reinkensmeier, T Uhlig und G Wagner</i>	
In-line surface treatment and diffusion bonding of oxide forming metals	410
<i>S Habisch and P Mayr</i>	
Interface microstructure characterization of joints fabricated by oblique impact welding	411
<i>S Sharafiev, B Niessen, C Pabst, A Rebensdorf, MF-X Wagner, P Groche and S Böhm</i>	
Application of TiC reinforced Fe-based coatings by means of High Velocity Air Fuel Spraying	412
<i>K Bobzin, M Öte, MA Knoch, X Liao and J Sommer</i>	
Processing of AlCoCrFeNiTi high entropy alloy by atmospheric plasma spraying	421
<i>M Löbel, T Lindner, C Kohrt and T Lampke</i>	
Self-sharpening-effect of nickel-diamond coatings sprayed by HVOF	430
<i>W Tillmann, A Brinkhoff, C Schaak, and J Zajaczkowski</i>	

Gas nitriding as thermochemical post heat treatment of thermal spray stainless steel coatings	438
<i>P Kutschmann, T Lindner and T Lampke</i>	
Zinc-doped hydroxyapatite coatings developed by plasma spraying of precursor solution	439
<i>R Candidato, R Serge and L Pawlowski</i>	
Investigation of porosity and oxide contents in thermally sprayed coatings – application and discussion of different methods	440
<i>I Ali, E Saborowski, H Liborius, R Börner, A Schubert and T Lampke</i>	
Deformation analysis of pseudoelastic NiTi shape memory alloys	441
<i>E Elibol, M Pouya and M F-X Wagner</i>	
Microstructural evolution during tension-compression in-plane deformation of a pure aluminum sheet	442
<i>M Härtel, B Bohne and M F-X Wagner</i>	
Analysis of the complex stress state during early loading in cylindrical compression-shear specimens	449
<i>S Pfeiffer, P Frint and M F-X Wagner</i>	
High temperature and dynamic testing of AHSS for an analytical description of the adiabatic cutting process	458
<i>S Winter, F Schmitz, T Clausmeyer, A E Tekkaya and M F-X Wagner</i>	
Punktuelle Faserverbund-Metall-Verbindungen und deren Prüfung	469
<i>D Krüger und R Winkelmann</i>	
Reduction of liquid metal embrittlement in copper-brazed stainless steel joints	477
<i>T Uhlig, V Fedorov, M Elßner, G Wagner and S Weis</i>	
Influence of laser beam hardening on the mechanical properties of ledeburitic chrome steel	484
<i>P Landgraf, J Schubert, T Grund, E Haack and T Lampke</i>	
Macromechanical finite-element simulations for predicting microstructures by experimental calibration	485
<i>T Mehner, A Bauer, B Awiszus and T Lampke</i>	

Analogies between continuum dislocation theory, continuum mechanics and fluid mechanics	493
<i>C B Silbermann and J Ihlemann</i>	
On the interplay of strengthening mechanisms in low-temperature extruded AA6060	494
<i>N Berndt, P Frint and M F-X Wagner</i>	
Downscaled anodic oxidation process for aluminium in oxalic acid	495
<i>M Sieber, R Morgenstern, D Kuhn, M Hackert-Oschätzchen, A Schubert and T Lampke</i>	
Gibbs energy calculation of electrolytic plasma channel with inclusions of copper and copper oxide with Al-base	502
<i>V M Posuvailo, M D Klapkiv, M M Student, Y Y Sirak and H V Pokhmurska</i>	