Franz Roters

List of Publications by Year
in descending order

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122 papers	10,863 citations	36203 51 h-index	30848 102 g-index
128 all docs	128 docs citations	128 times ranked	4974 citing authors

#	Article	IF	Citations
1	Overview of constitutive laws, kinematics, homogenization and multiscale methods in crystal plasticity finite-element modeling: Theory, experiments, applications. Acta Materialia, 2010, 58, 1152-1211.	3.8	1,558
2	DAMASK â€“ The DÃ¼sseldorf Advanced Material Simulation Kit for modeling multi-physics crystal plasticity, thermal, and damage phenomena from the single crystal up to the component scale. Computational Materials Science, 2019, 158, 420-478.	1.4	440
3	Revealing the strain-hardening behavior of twinning-induced plasticity steels: Theory, simulations, experiments. Acta Materialia, 2013, 61, 494-510.	3.8	429
4	Strain localization and damage in dual phase steels investigated by coupled in-situ deformation experiments and crystal plasticity simulations. International Journal of Plasticity, 2014, 63, 198-210.	4.1	412
5	Micromechanical and macromechanical effects in grain scale polycrystal plasticity experimentation and simulation. Acta Materialia, 2001, 49, 3433-3441.	3.8	388
6	Work hardening in heterogeneous alloysâ€”a microstructural approach based on three internal state variables. Acta Materialia, 2000, 48, 4181-4189.	3.8	379
7	A spectral method solution to crystal elasto-viscoplasticity at finite strains. International Journal of Plasticity, 2013, 46, 37-53.	4.1	332
8	A dislocation density based constitutive model for crystal plasticity FEM including geometrically necessary dislocations. Acta Materialia, 2006, 54, 2169-2179.	3.8	329
9	The role of heterogeneous deformation on damage nucleation at grain boundaries in single phase metals. International Journal of Plasticity, 2009, 25, 1655-1683.	4.1	304
10	Integrated experimentalâ€“simulation analysis of stress and strain partitioning in multiphase alloys. Acta Materialia, 2014, 81, 386-400.	3.8	285
11	Three-dimensional investigation of the texture and microstructure below a nanoindent in a Cu single crystal using 3D EBSD and crystal plasticity finite element simulations. Acta Materialia, 2006, 54, 1863-1876.	3.8	282
12	Orientation dependence of nanoindentation pile-up patterns and of nanoindentation microtextures in copper single crystals. Acta Materialia, 2004, 52, 2229-2238.	3.8	247
13	A constitutive model for fcc single crystals based on dislocation densities and its application to uniaxial compression of aluminium single crystals. Acta Materialia, 2004, 52, 3603-3612.	3.8	232
14	On the consideration of interactions between dislocations and grain boundaries in crystal plasticity finite element modeling â€“ Theory, experiments, and simulations. Acta Materialia, 2006, 54, 2181-2194.	3.8	198
15	Using texture components in crystal plasticity finite element simulations. International Journal of Plasticity, 2004, 20, 339-361.	4.1	196
16	Theory of orientation gradients in plastically strained crystals. Acta Materialia, 2002, 50, 421-440.	3.8	195
17	A crystal plasticity model for twinning- and transformation-induced plasticity. Acta Materialia, 2016, 118, 140-151.	3.8	175
18	DAMASK: the DÃ¼sseldorf Advanced MAterial Simulation Kit for studying crystal plasticity using an FE based or a spectral numerical solver. Procedia IUTAM, 2012, 3, 3-10.	1.2	159

#	Article	IF	Citations
19	Numerically robust spectral methods for crystal plasticity simulations of heterogeneous materials. International Journal of Plasticity, 2015, 66, 31-45.	4.1	159
20	A virtual laboratory using high resolution crystal plasticity simulations to determine the initial yield surface for sheet metal forming operations. International Journal of Plasticity, 2016, 80, 111-138.	4.1	147
21	Unraveling the temperature dependence of the yield strength in single-crystal tungsten using atomistically-informed crystal plasticity calculations. International Journal of Plasticity, 2016, 78, 242-265.	4.1	137
22	Orientation dependence of shear banding in face-centered-cubic single crystals. Acta Materialia, 2012, 60, 3415-3434.	3.8	129
23	An integrated crystal plasticityâ€“phase field model for spatially resolved twin nucleation, propagation, and growth in hexagonal materials. International Journal of Plasticity, 2018, 106, 203-227.	4.1	125
24	Dislocation mechanism based size-dependent crystal plasticity modeling and simulation of gradient nano-grained copper. International Journal of Plasticity, 2019, 113, 52-73.	4.1	125
25	Effects of initial orientation, sample geometry and friction on anisotropy and crystallographic orientation changes in single crystal microcompression deformation: A crystal plasticity finite element study. Acta Materialia, 2007, 55, 4567-4583.	3.8	120
26	Smaller is stronger: The effect of strain hardening. Acta Materialia, 2009, 57, 5996-6005.	3.8	115
27	Current Challenges and Opportunities in Microstructure-Related Properties of Advanced High-Strength Steels. Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science, 2020, 51, 5517-5586.	1.1	115
28	Microstructure and texture evolution in dual-phase steels: Competition between recovery, recrystallization, and phase transformation. Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing, 2010, 527, 4161-4168.	2.6	111
29	On the origin of deformation-induced rotation patterns below nanoindents. Acta Materialia, 2008, 56, 31-42.	3.8	103
30	Dislocation density distribution around an indent in single-crystalline nickel: Comparing nonlocal crystal plasticity finite-element predictions with experiments. Acta Materialia, 2014, 71, 333-348.	3.8	103
31	Temperature dependent strain hardening and fracture behavior of TWIP steel. International Journal of Plasticity, 2018, 104, 80-103.	4.1	98
32	Recrystallization behavior of a high-manganese steel: Experiments and simulations. Acta Materialia, 2015, 100, 155-168.	3.8	96
33	Elasto-viscoplastic phase field modelling of anisotropic cleavage fracture. Journal of the Mechanics and Physics of Solids, 2017, 99, 19-34.	2.3	94
34	Crystal plasticity simulation study on the influence of texture on earing in steel. Computational Materials Science, 2005, 34, 221-234.	1.4	92
35	Applying the texture analysis for optimizing thermomechanical treatment of high manganese twinning-induced plasticity steel. Acta Materialia, 2014, 80, 327-340.	3.8	92
36	In situ observation of collective grain-scale mechanics in Mg and Mgâ€“rare earth alloys. Acta Materialia, 2014, 80, 77-93.	3.8	91

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37	Non-crystallographic shear banding in crystal plasticity FEM simulations: Example of texture evolution in Î±-brass. Acta Materialia, 2012, 60, 1099-1115.	3.8	87
38	Dislocation interactions and low-angle grain boundary strengthening. Acta Materialia, 2011, 59, 7125-7134.	3.8	84
39	Simulation of dislocation penetration through a general low-angle grain boundary. Acta Materialia, 2012, 60, 5380-5390.	3.8	79
40	A phase field model for damage in elasto-viscoplastic materials. Computer Methods in Applied Mechanics and Engineering, 2016, 312, 167-185.	3.4	79
41	The mechanical size effect as a mean-field breakdown phenomenon: Example of microscale single crystal beam bending. Acta Materialia, 2010, 58, 1876-1886.	3.8	78
42	Concepts for Integrating Plastic Anisotropy into Metal Forming Simulations. Advanced Engineering Materials, 2002, 4, 169-180.	1.6	72
43	A texture optimization study for minimum earing in aluminium by use of a texture component crystal plasticity finite element method. Acta Materialia, 2004, 52, 1003-1012.	3.8	71
44	Identifying Structureâ€“Property Relationships Through DREAM.3D Representative Volume Elements and DAMASK Crystal Plasticity Simulations: An Integrated Computational Materials Engineering Approach. Jom, 2017, 69, 848-855.	0.9	71
45	Studying the effect of grain boundaries in dislocation density based crystal-plasticity finite element simulations. International Journal of Solids and Structures, 2006, 43, 7287-7303.	1.3	68
46	Simulation of shear banding in heterophase co-deformation: Example of plane strain compressed Cuâ€“Ag and Cuâ€“Nb metal matrix composites. Acta Materialia, 2013, 61, 4591-4606.	3.8	68
47	A dislocation density based constitutive law for BCC materials in crystal plasticity FEM. Computational Materials Science, 2007, 39, 91-95.	1.4	65
48	Virtual material testing for stamping simulations based on polycrystal plasticity. Computational Materials Science, 2009, 46, 383-392.	1.4	65
49	Anisotropic polycrystal plasticity due to microstructural heterogeneity: A multi-scale experimental and numerical study on additively manufactured metallic materials. Acta Materialia, 2020, 185, 340-369.	3.8	64
50	Crystal plasticity study on stress and strain partitioning in a measured 3D dual phase steel microstructure. Physical Mesomechanics, 2017, 20, 311-323.	1.0	58
51	Selecting a set of discrete orientations for accurate texture reconstruction. Computational Materials Science, 2008, 42, 670-678.	1.4	57
52	Microstructure-based multiscale modeling of large strain plastic deformation by coupling a full-field crystal plasticity-spectral solver with an implicit finite element solver. International Journal of Plasticity, 2020, 125, 97-117.	4.1	52
53	Interfacial dislocation motion and interactions in single-crystal superalloys. Acta Materialia, 2014, 79, 216-233.	3.8	50
54	Experimentalâ€“numerical study on strain and stress partitioning in bainitic steels with martensiteâ€“austenite constituents. International Journal of Plasticity, 2018, 104, 39-53.	4.1	48

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55	Coupled Crystal Plasticityâ€“Phase Field Fracture Simulation Study on Damage Evolution Around a Void: Pore Shape Versus Crystallographic Orientation. Jom, 2017, 69, 872-878.	0.9	46
56	Neighborhood influences on stress and strain partitioning in dual-phase microstructures. Meccanica, 2016, 51, 429-441.	1.2	45
57	A Finite Element approach with patch projection for strain gradient plasticity formulations. International Journal of Plasticity, 2007, 23, 690-710.	4.1	42
58	Simulation of earing of a 17% Cr stainless steel considering texture gradients. Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing, 2008, 488, 482-490.	2.6	42
59	Constitutive modeling of strain induced grain boundary migration via coupling crystal plasticity and phase-field methods. International Journal of Plasticity, 2017, 99, 19-42.	4.1	40
60	Simulation of earing during deep drawing of an Alâ€“3% Mg alloy (AA 5754) using a texture component crystal plasticity FEM. Journal of Materials Processing Technology, 2007, 183, 169-175.	3.1	39
61	Understanding the mechanisms of electroplasticity from a crystal plasticity perspective. Modelling and Simulation in Materials Science and Engineering, 2019, 27, 085006.	0.8	37
62	Comparison of Single Crystal Simple Shear Deformation Experiments with Crystal Plasticity Finite Element Simulations. Advanced Engineering Materials, 2004, 6, 653-656.	1.6	30
63	Bending of single crystal microcantilever beams of cube orientation: Finite element model and experiments. Journal of the Mechanics and Physics of Solids, 2010, 58, 1599-1612.	2.3	28
64	Using spectral-based representative volume element crystal plasticity simulations to predict yield surface evolution during large scale forming simulations. Journal of Materials Processing Technology, 2020, 277, 116449.	3.1	28
65	Multiscale simulation of polycrystal mechanics of textured Î²â€Ti alloys using ab initio and crystalâ€based finite element methods. Physica Status Solidi (B): Basic Research, 2008, 245, 2642-2648.	0.7	26
66	Development and application of constitutive equations for the multiple-stand hot rolling of Al-alloys. Journal of Materials Processing Technology, 2002, 123, 155-166.	3.1	25
67	Ab initio-guided design of twinning-induced plasticity steels. MRS Bulletin, 2016, 41, 320-325.	1.7	25
68	Application of a dislocation model for FE-process simulation. Computational Materials Science, 2001, 21, 1-8.	1.4	24
69	Application of crystal plasticity FEM from single crystal to bulk polycrystal. Computational Materials Science, 2005, 32, 509-517.	1.4	24
70	Comparison of texture evolution in fcc metals predicted by various grain cluster homogenization schemes. International Journal of Materials Research, 2009, 100, 500-509.	0.1	24
71	FFT-based interface decohesion modelling by a nonlocal interphase. Advanced Modeling and Simulation in Engineering Sciences, 2018, 5, .	0.7	24
72	Determination and analysis of the constitutive parameters of temperature-dependent dislocation-density-based crystal plasticity models. Mechanics of Materials, 2022, 164, 104117.	1.7	24

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73	Analysis of the plastic anisotropy and pre-yielding of (Î³/Îµ2)-phase titanium aluminide microstructures by crystal plasticity simulation. Intermetallics, 2011, 19, 820-827.	1.8	23
74	A finite element method on the basis of texture components for fast predictions of anisotropic forming operations. Steel Research = Archiv FÃ¼r Das EisenhÃ¼ttenwesen, 2001, 72, 421-426.	0.2	21
75	A new concept for the calculation of the mobile dislocation density in constitutive models of strain hardening. Physica Status Solidi (B): Basic Research, 2003, 240, 68-74.	0.7	21
76	Multiscale Modelling of Hydrogen Transport and Segregation in Polycrystalline Steels. Metals, 2018, 8, 430.	1.0	21
77	An FFT-based spectral solver for interface decohesion modelling using a gradient damage approach. Computational Mechanics, 2020, 65, 925-939.	2.2	17
78	Numerical study of textures and Lankford values for FCC polycrystals by use of a modified Taylor model. Computational Materials Science, 2004, 29, 353-361.	1.4	16
79	Large-deformation crystal plasticity simulation of microstructure and microtexture evolution through adaptive remeshing. International Journal of Plasticity, 2021, 146, 103078.	4.1	16
80	Crystal plasticity study of monocrystalline stochastic honeycombs under in-plane compression. Acta Materialia, 2016, 103, 796-808.	3.8	15
81	Crystal plasticity simulation of in-grain microstructural evolution during large deformation of IF-steel. Acta Materialia, 2022, 237, 118167.	3.8	15
82	Texture Evolution During Bending of a Single Crystal Copper Nanowire Studied by EBSD and Crystal Plasticity Finite Element Simulations. Advanced Engineering Materials, 2008, 10, 737-741.	1.6	14
83	A numerical study of the influence of crystal plasticity modeling parameters on the plastic anisotropy of rolled aluminum sheet. Modelling and Simulation in Materials Science and Engineering, 2020, 28, 085005.	0.8	14
84	Linking atomistic, kinetic Monte Carlo and crystal plasticity simulations of singleâ€crystal tungsten strength. GAMM Mitteilungen, 2015, 38, 213-227.	2.7	13
85	Lath Martensite Microstructure Modeling: A High-Resolution Crystal Plasticity Simulation Study. Materials, 2021, 14, 691.	1.3	13
86	On the role of the collinear dislocation interaction in deformation patterning and laminate formation in single crystal plasticity. Mechanics of Materials, 2018, 125, 70-79.	1.7	12
87	Assessing and ensuring parameter identifiability for a physically-based strain hardening model for twinning-induced plasticity. Mechanics of Materials, 2015, 84, 127-139.	1.7	11
88	Solving Material Mechanics and Multiphysics Problems of Metals with Complex Microstructures Using DAMASKâ€”The DÃ¼sseldorf Advanced Material Simulation Kit. Advanced Engineering Materials, 2020, 22, 1901044.	1.6	11
89	On the Modeling of Dual Phase Steels: Microstructure-based Simulation from the Hot Rolled Sheet to the Deep Drawn Component. International Journal of Material Forming, 2010, 3, 73-76.	0.9	10
90	Microstructural Influences on Fracture at Prior Austenite Grain Boundaries in Dual-Phase Steels. Materials, 2019, 12, 3687.	1.3	10

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91	Modeling and simulation of microstructure in metallic systems based on multi-physics approaches. Npj Computational Materials, 2022, 8, .	3.5	10
92	Iso-Work-Rate Weighted-Taylor Homogenization Scheme for Multiphase Steels Assisted by Transformation-induced Plasticity Effect. Steel Research International, 2007, 78, 777-783.	1.0	9
93	Spontaneous Dislocation Annihilation Explains the Breakdown of the Power Law of Steady State Deformation. Physica Status Solidi A, 2001, 184, 257-261.	1.7	8
94	A Texture Evolution Study Using the Texture Component Crystal Plasticity FEM. Materials Science Forum, 2005, 495-497, 937-944.	0.3	7
95	Microstructure Evolution during Recrystallization in Dual-Phase Steels. Materials Science Forum, 0, 715-716, 13-22.	0.3	7
96	Spectral Solvers for Crystal Plasticity and Multi-physics Simulations. , 2019, , 1347-1372.		7
97	A Texture Component Crystal Plasticity Finite Element Method for Physically-Based Metal Forming Simulations Including Texture Update. Materials Science Forum, 2002, 396-402, 31-38.	0.3	6
98	Simulation of Earing during Deep Drawing of bcc Steel by Use of a Texture Component Crystal Plasticity Finite Element Method. Materials Science Forum, 2005, 495-497, 1529-1534.	0.3	6
99	On strain gradients and size-dependent hardening descriptions in crystal plasticity frameworks. Metals and Materials International, 2006, 12, 407-411.	1.8	5
100	Texture prediction from a novel grain cluster-based homogenization scheme. International Journal of Material Forming, 2009, 2, 523-526.	0.9	5
101	Relaxed grain cluster (RGC) homogenization scheme. International Journal of Material Forming, 2009, 2, 939-942.	0.9	5
102	Experimental and numerical investigations of the plane strain compression of an oligocrystalline pure copper specimen. Journal of Materials Processing Technology, 2011, 211, 1305-1323.	3.1	5
103	A Flexible and Efficient Output File Format for Grain-Scale Multiphysics Simulations. Integrating Materials and Manufacturing Innovation, 2017, 6, 83-91.	1.2	5
104	Development of a Model for Dynamic Recrystallization Consistent with the Second Derivative Criterion. Materials, 2017, 10, 1259.	1.3	5
105	Spectral Solvers for Crystal Plasticity and Multi-physics Simulations. , 2018, , 1-27.		5
106	Analytical bounds of in-plane Youngâ€™s modulus and full-field simulations of two-dimensional monocrystalline stochastic honeycomb structures. Computational Materials Science, 2015, 109, 323-329.	1.4	4
107	Quantification of 3D spatial correlations between state variables and distances to the grain boundary network in full-field crystal plasticity spectral method simulations. Modelling and Simulation in Materials Science and Engineering, 2020, 28, 055005.	0.8	4
108	EBSD Study of Substructure and Texture Formation in Dual-Phase Steel Sheets for Semi-Finished Products. Solid State Phenomena, 2010, 160, 251-256.	0.3	3

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109	Computer-Aided Material Design for Crash Boxes Made of High Manganese Steels. Metals, 2019, 9, 772.	1.0	3
110	The through-process texture analysis of plate rolling by coupling finite element and fast Fourier transform crystal plasticity analysis. Modelling and Simulation in Materials Science and Engineering, 2019, 27, 085005.	0.8	3
111	Application of the Texture Component Crystal Plasticity Finite Element Method for Deep Drawing Simulations-A Comparison with Hillâ€™s Yield Criterion. Advanced Engineering Materials, 2002, 4, 221-223.	1.6	2
112	Spectral Solvers for Crystal Plasticity and Multi-physics Simulations. , 2019, , 1-26.		2
113	Phase-Field Extension of Crystal Plasticity with Application to Hardening Modeling. , 2005, , 501-511.		1
114	Editorial Steel ab initio. Steel Research International, 2011, 82, 85-85.	1.0	1
115	Yield locus prediction using statistical and RVE-based fast Fourier transform crystal plasticity models and validation for drawing steels. Journal of Physics: Conference Series, 2018, 1063, 012051.	0.3	1
116	Spectral Solvers for Crystal Plasticity and Multi-physics Simulations. , 2018, , 1-25.		1
117	Mapping the Crystal Orientation Distribution Function to Discrete Orientations in Crystal Plasticity Finite Element Forming Simulations of Bulk Materials. Materials Science Forum, 2006, 519-521, 803-808.	0.3	0
118	Recent Progress in the 3D Experimentation and Simulation of Nanoindents. Materials Science Forum, 2007, 550, 199-204.	0.3	0
119	Mechanism Oriented Steel Development. Steel Research International, 2007, 78, 195-198.	1.0	0
120	Thermo-mechanical stresses within switching contact systems after arcing events. , 2017, , .		0
121	Spectral Solvers for Crystal Plasticity and Multi-physics Simulations. , 2019, , 1-25.		0
122	Characterizing Localized Microstructural Deformation of Multiphase Steel by Crystal Plasticity Simulation with Multi-Constitutive Law. Journal of the Japan Society for Technology of Plasticity, 2022, 63, 1-8.	0.0	0