Dierk Raabe

List of Publications by Citations

1,038 papers	56,722 citations	122 h-index	194 g-index
1,087 ext. papers	67,736 ext. citations	6.1 avg, IF	8.41 L-index

#	Paper	IF	Citations
1038	Metastable high-entropy dual-phase alloys overcome the strength-ductility trade-off. *Nature*, **2016**, 534, 227-30	50.4	1718
1037	Overview of constitutive laws, kinematics, homogenization and multiscale methods in crystal plasticity finite-element modeling: Theory, experiments, applications. *Acta Materialia*, **2010**, 58, 1152-1211	8.4	1239
1036	Orientation gradients and geometrically necessary dislocations in ultrafine grained dual-phase steels studied by 2D and 3D EBSD. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2010**, 527, 2738-2746	5.3	990
1035	High-entropy alloys. *Nature Reviews Materials*, **2019**, 4, 515-534	73.3	932
1034	Dislocation and twin substructure evolution during strain hardening of an Fe□22 wt.% Mn□0.6 wt.% C TWIP steel observed by electron channeling contrast imaging. *Acta Materialia*, **2011**, 59, 6449-6462	8.4	529
1033	Enhanced strength and ductility in a high-entropy alloy via ordered oxygen complexes. *Nature*, **2018**, 563, 546-550	50.4	516
1032	Ultrastrong steel via minimal lattice misfit and high-density nanoprecipitation. *Nature*, **2017**, 544, 460-464	50.4	512
1031	Deformation and fracture mechanisms in fine- and ultrafine-grained ferrite/martensite dual-phase steels and the effect of aging. *Acta Materialia*, **2011**, 59, 658-670	8.4	496
1030	Decomposition of the single-phase high-entropy alloy CrMnFeCoNi after prolonged anneals at intermediate temperatures. *Acta Materialia*, **2016**, 112, 40-52	8.4	485
1029	The effect of grain size and grain orientation on deformation twinning in a Fe□22wt.% Mn□0.6wt.% C TWIP steel. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2010**, 527, 3552-3560	5.3	479
1028	Overview of processing, microstructure and mechanical properties of ultrafine grained bcc steels. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing* , **2006**, 441, 1-17	5.3	436
1027	Design of a twinning-induced plasticity high entropy alloy. *Acta Materialia*, **2015**, 94, 124-133	8.4	435
1026	A novel, single phase, non-equiatomic FeMnNiCoCr high-entropy alloy with exceptional phase stability and tensile ductility. *Scripta Materialia*, **2014**, 72-73, 5-8	5.6	392
1025	The crustacean exoskeleton as an example of a structurally and mechanically graded biological nanocomposite material. *Acta Materialia*, **2005**, 53, 4281-4292	8.4	379
1024	The relation between ductility and stacking fault energies in Mg and Mg□ alloys. *Acta Materialia*, **2012**, 60, 3011-3021	8.4	359
1023	Revealing the strain-hardening behavior of twinning-induced plasticity steels: Theory, simulations, experiments. *Acta Materialia*, **2013**, 61, 494-510	8.4	357
1022	Micromechanical and macromechanical effects in grain scale polycrystal plasticity experimentation and simulation. *Acta Materialia*, **2001**, 49, 3433-3441	8.4	341

1021	Design of a novel Mn-based 1GPa duplex stainless TRIP steel with 60% ductility by a reduction of austenite stability. *Acta Materialia*, **2011**, 59, 4653-4664	8.4	337
1020	An Overview of Dual-Phase Steels: Advances in Microstructure-Oriented Processing and Micromechanically Guided Design. *Annual Review of Materials Research*, **2015**, 45, 391-431	12.8	331
1019	A TRIP-assisted dual-phase high-entropy alloy: Grain size and phase fraction effects on deformation behavior. *Acta Materialia*, **2017**, 131, 323-335	8.4	323
1018	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	7.6	320
1017	Grain boundary segregation engineering in metallic alloys: A pathway to the design of interfaces. *Current Opinion in Solid State and Materials Science*, **2014**, 18, 253-261	12	319
1016	Work hardening in heterogeneous alloys□ microstructural approach based on three internal state variables. *Acta Materialia*, **2000**, 48, 4181-4189	8.4	318
1015	Multistage strain hardening through dislocation substructure and twinning in a high strength and ductile weight-reduced Fe□Mn□Al□C steel. *Acta Materialia*, **2012**, 60, 5791-5802	8.4	310
1014	On the formation and growth of intermetallic phases during interdiffusion between low-carbon steel and aluminum alloys. *Acta Materialia*, **2011**, 59, 1586-1600	8.4	294
1013	Ab initio thermodynamics of the CoCrFeMnNi high entropy alloy: Importance of entropy contributions beyond the configurational one. *Acta Materialia*, **2015**, 100, 90-97	8.4	277
1012	Hydrogen-assisted decohesion and localized plasticity in dual-phase steel. *Acta Materialia*, **2014**, 70, 174-187	8.4	270
1011	A dislocation density based constitutive model for crystal plasticity FEM including geometrically necessary dislocations. *Acta Materialia*, **2006**, 54, 2169-2179	8.4	264
1010	Mechanical properties of an ultrafine grained C□Mn steel processed by warm deformation and annealing. *Acta Materialia*, **2005**, 53, 4881-4892	8.4	257
1009	Experimental and numerical study on geometrically necessary dislocations and non-homogeneous mechanical properties of the ferrite phase in dual phase steels. *Acta Materialia*, **2011**, 59, 4387-4394	8.4	256
1008	Investigation of the indentation size effect through the measurement of the geometrically necessary dislocations beneath small indents of different depths using EBSD tomography. *Acta Materialia*, **2009**, 57, 559-569	8.4	256
1007	The role of heterogeneous deformation on damage nucleation at grain boundaries in single phase metals. *International Journal of Plasticity*, **2009**, 25, 1655-1683	7.6	255
1006	The influence of stacking fault energy on the microstructural and strain-hardening evolution of Fe□Mn□Al□Si steels during tensile deformation. *Acta Materialia*, **2015**, 100, 178-190	8.4	253
1005	Corrosion behavior of an equiatomic CoCrFeMnNi high-entropy alloy compared with 304 stainless steel in sulfuric acid solution. *Corrosion Science*, **2018**, 134, 131-139	6.8	248
1004	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	8.4	247

1003	Effect of grain refinement to 1 µm on strength and toughness of dual-phase steels. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2010**, 527, 7832-7840	5.3	244
1002	Atomic-scale quantification of grain boundary segregation in nanocrystalline material. *Physical Review Letters*, **2014**, 112, 126103	7.4	239
1001	Revealing the design principles of high-performance biological composites using ab initio and multiscale simulations: the example of lobster cuticle. *Advanced Materials*, **2010**, 22, 519-26	24	239
1000	DAMASK – The Düsseldorf 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	3.2	237
999	The influence of manganese content on the stacking fault and austenite/ε-martensite interfacial energies in Fe–Mn–(Al–Si) steels investigated by experiment and theory. *Acta Materialia*, **2014**, 68, 238-253	8.4	236
998	Microstructure and crystallographic texture of an ultrafine grained C–Mn steel and their evolution during warm deformation and annealing. *Acta Materialia*, **2005**, 53, 845-858	8.4	236
997	Steels in additive manufacturing: A review of their microstructure and properties. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2020**, 772, 138633	5.3	232
996	Cellular Automata in Materials Science with Particular Reference to Recrystallization Simulation. *Annual Review of Materials Research*, **2002**, 32, 53-76	12.8	230
995	Atomic-scale mechanisms of deformation-induced cementite decomposition in pearlite. *Acta Materialia*, **2011**, 59, 3965-3977	8.4	227
994	Integrated experimental–simulation analysis of stress and strain partitioning in multiphase alloys. *Acta Materialia*, **2014**, 81, 386-400	8.4	221
993	Efficient and accurate simulations of deformable particles immersed in a fluid using a combined immersed boundary lattice Boltzmann finite element method. *Computers and Mathematics With Applications*, **2011**, 61, 3485-3505	2.7	218
992	Chemical gradients across phase boundaries between martensite and austenite in steel studied by atom probe tomography and simulation. *Acta Materialia*, **2011**, 59, 364-374	8.4	212
991	Segregation engineering enables nanoscale martensite to austenite phase transformation at grain boundaries: A pathway to ductile martensite. *Acta Materialia*, **2013**, 61, 6132-6152	8.4	211
990	Investigation of three-dimensional aspects of grain-scale plastic surface deformation of an aluminum oligocrystal. *International Journal of Plasticity*, **2008**, 24, 2278-2297	7.6	211
989	Hot cracking mechanism affecting a non-weldable Ni-based superalloy produced by selective electron Beam Melting. *Acta Materialia*, **2018**, 142, 82-94	8.4	210
988	Interstitial atoms enable joint twinning and transformation induced plasticity in strong and ductile high-entropy alloys. *Scientific Reports*, **2017**, 7, 40704	4.9	207
987	Bone-like crack resistance in hierarchical metastable nanolaminate steels. *Science*, **2017**, 355, 1055-1057	33.3	206
986	Orientation dependence of nanoindentation pile-up patterns and of nanoindentation microtextures in copper single crystals. *Acta Materialia*, **2004**, 52, 2229-2238	8.4	202

985	Influence of Al content and precipitation state on the mechanical behavior of austenitic high-Mn low-density steels. *Scripta Materialia*, **2013**, 68, 343-347	5.6	201
984	Grain size effect on strain hardening in twinning-induced plasticity steels. *Scripta Materialia*, **2012**, 66, 992-996	5.6	199
983	Microstructure and crystallographic texture of the chitin-protein network in the biological composite material of the exoskeleton of the lobster Homarus americanus. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2006**, 421, 143-153	5.3	198
982	Electron channeling contrast imaging of twins and dislocations in twinning-induced plasticity steels under controlled diffraction conditions in a scanning electron microscope. *Scripta Materialia*, **2009**, 61, 737-740	5.6	197
981	Nanoprecipitate-hardened 1.5 GPa steels with unexpected high ductility. *Scripta Materialia*, **2009**, 60, 1141-1144	5.6	196
980	Rolling and recrystallization textures of bcc steels. *Steel Research = Archiv F□ Das Eisenh□ttenwesen*, **1991**, 62, 567-575		196
979	Ductility improvement of Mg alloys by solid solution: Ab initio modeling, synthesis and mechanical properties. *Acta Materialia*, **2014**, 70, 92-104	8.4	189
978	Theory-guided bottom-up design of □-titanium alloys as biomaterials based on first principles calculations: Theory and experiments. *Acta Materialia*, **2007**, 55, 4475-4487	8.4	188
977	Linear complexions: Confined chemical and structural states at dislocations. *Science*, **2015**, 349, 1080-3	33.3	187
976	Segregation stabilizes nanocrystalline bulk steel with near theoretical strength. *Physical Review Letters*, **2014**, 113, 106104	7.4	182
975	Influence of Structural Principles on the Mechanics of a Biological Fiber-Based Composite Material with Hierarchical Organization: The Exoskeleton of the Lobster Homarus americanus. *Advanced Materials*, **2009**, 21, 391-400	24	180
974	Smaller is less stable: Size effects on twinning vs. transformation of reverted austenite in TRIP-maraging steels. *Acta Materialia*, **2014**, 79, 268-281	8.4	179
973	Ab initio assisted design of quinary dual-phase high-entropy alloys with transformation-induced plasticity. *Acta Materialia*, **2017**, 136, 262-270	8.4	179
972	The composition of the exoskeleton of two crustacea: The American lobster Homarus americanus and the edible crab Cancer pagurus. *Thermochimica Acta*, **2007**, 463, 65-68	2.9	179
971	Hydrogen-assisted failure in a twinning-induced plasticity steel studied under in situ hydrogen charging by electron channeling contrast imaging. *Acta Materialia*, **2013**, 61, 4607-4618	8.4	178
970	Three-Dimensional Orientation Microscopy in a Focused Ion Beam–Scanning Electron Microscope: A New Dimension of Microstructure Characterization. *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, **2008**, 39, 374-389	2.3	174
969	Strain hardening by dynamic slip band refinement in a high-Mn lightweight steel. *Acta Materialia*, **2016**, 116, 188-199	8.4	173
968	Grain-scale micromechanics of polycrystal surfaces during plastic straining. *Acta Materialia*, **2003**, 51, 1539-1560	8.4	173

967	On the consideration of interactions between dislocations and grain boundaries in crystal plasticity finite element modeling Theory, experiments, and simulations. *Acta Materialia*, **2006**, 54, 2181-2194	8.4	172
966	Textures of ferritic stainless steels. *Materials Science and Technology*, **1993**, 9, 302-312	1.5	171
965	Atomic-scale analysis of carbon partitioning between martensite and austenite by atom probe tomography and correlative transmission electron microscopy. *Acta Materialia*, **2014**, 65, 215-228	8.4	167
964	Grain boundary segregation engineering and austenite reversion turn embrittlement into toughness: Example of a 9 wt.% medium Mn steel. *Acta Materialia*, **2015**, 86, 182-192	8.4	166
963	Coupling of a crystal plasticity finite-element model with a probabilistic cellular automaton for simulating primary static recrystallization in aluminium. *Modelling and Simulation in Materials Science and Engineering*, **2000**, 8, 445-462	2	166
962	Hierarchical microstructure of explosive joints: Example of titanium to steel cladding. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2011**, 528, 2641-2647	5.3	165
961	Theory of orientation gradients in plastically strained crystals. *Acta Materialia*, **2002**, 50, 421-440	8.4	165
960	Overview of hydrogen embrittlement in high-Mn steels. *International Journal of Hydrogen Energy*, **2017**, 42, 12706-12723	6.7	164
959	Microstructural evolution of a Ni-based superalloy (617B) at 700 °C studied by electron microscopy and atom probe tomography. *Acta Materialia*, **2012**, 60, 1731-1740	8.4	164
958	Improvement of the work hardening rate of ultrafine grained steels through second phase particles. *Scripta Materialia*, **2005**, 52, 1075-1080	5.6	164
957	Relationship between rolling textures and shear textures in f.c.c. and b.c.c. metals. *Acta Metallurgica Et Materialia*, **1994**, 42, 879-886		164
956	Evolution of strength and microstructure during annealing of heavily cold-drawn 6.3 GPa hypereutectoid pearlitic steel wire. *Acta Materialia*, **2012**, 60, 4005-4016	8.4	159
955	Nanolaminate transformation-induced plasticity Twinning-induced plasticity steel with dynamic strain partitioning and enhanced damage resistance. *Acta Materialia*, **2015**, 85, 216-228	8.4	158
954	Using texture components in crystal plasticity finite element simulations. *International Journal of Plasticity*, **2004**, 20, 339-361	7.6	158
953	Phase stability of non-equiatomic CoCrFeMnNi high entropy alloys. *Acta Materialia*, **2015**, 98, 288-296	8.4	157
952	Assessment of geometrically necessary dislocation levels derived by 3D EBSD. *Acta Materialia*, **2015**, 99, 402-414	8.4	157
951	Influence of intermetallic phases and Kirkendall-porosity on the mechanical properties of joints between steel and aluminium alloys. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2011**, 528, 4630-4642	5.3	157
950	Experimental investigation of plastic grain interaction. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2002**, 336, 81-87	5.3	155

949	**1998**,		155
948	Metallic composites processed via extreme deformation: Toward the limits of strength in bulk materials. *MRS Bulletin*, **2010**, 35, 982-991	3.2	154
947	Basal and non-basal dislocation slip in Mg. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2013**, 576, 61-68	5.3	153
946	Overview of the lattice Boltzmann method for nano- and microscale fluid dynamics in materials science and engineering. *Modelling and Simulation in Materials Science and Engineering*, **2004**, 12, R13-R46	2	151
945	Strong and Ductile Non-equiatomic High-Entropy Alloys: Design, Processing, Microstructure, and Mechanical Properties. *Jom*, **2017**, 69, 2099-2106	2.1	150
944	Hierarchical microstructure design to tune the mechanical behavior of an interstitial TRIP-TWIP high-entropy alloy. *Acta Materialia*, **2019**, 163, 40-54	8.4	150
943	Carbon partitioning during quenching and partitioning heat treatment accompanied by carbide precipitation. *Acta Materialia*, **2015**, 86, 137-147	8.4	149
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941	Hydrogen-induced cracking at grain and twin boundaries in an Fe austenitic steel. *Scripta Materialia*, **2012**, 66, 459-462	5.6	141
940	Precipitation and austenite reversion behavior of a maraging steel produced by selective laser melting. *Journal of Materials Research*, **2014**, 29, 2072-2079	2.5	141
939	Boron doped ultrastrong and ductile high-entropy alloys. *Acta Materialia*, **2018**, 151, 366-376	8.4	139
938	Hydrogen embrittlement associated with strain localization in a precipitation-hardened Fe light weight austenitic steel. *International Journal of Hydrogen Energy*, **2014**, 39, 4634-4646	6.7	137
937	Retention of the Goss orientation between microbands during cold rolling of an Fe3%Si single crystal. *Acta Materialia*, **2007**, 55, 2519-2530	8.4	137
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935	Effects of retained austenite volume fraction, morphology, and carbon content on strength and ductility of nanostructured TRIP-assisted steels. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2015**, 636, 551-564	5.3	136
934	Elemental partitioning and mechanical properties of Ti- and Ta-containing Co-Al-W-base superalloys studied by atom probe tomography and nanoindentation. *Acta Materialia*, **2014**, 78, 78-85	8.4	136
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930	Microtexture and Chitin/Calcite Orientation Relationship in the Mineralized Exoskeleton of the American Lobster. *Advanced Functional Materials*, **2008**, 18, 3307-3314	15.6	134
929	On the room temperature deformation mechanisms of a Mg□□Zn alloy with long-period-stacking-ordered structures. *Acta Materialia*, **2015**, 82, 414-423	8.4	133
928	DAMASK: the D□sseldorf Advanced MAterial Simulation Kit for studying crystal plasticity using an FE based or a spectral numerical solver. *Procedia IUTAM*, **2012**, 3, 3-10		132
927	Ultrastrong Medium-Entropy Single-Phase Alloys Designed via Severe Lattice Distortion. *Advanced Materials*, **2019**, 31, e1807142	24	132
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925	Mechanical alloying and amorphization in Cu□Nb□Ag in situ composite wires studied by transmission electron microscopy and atom probe tomography. *Acta Materialia*, **2009**, 57, 5254-5263	8.4	131
924	3D structural and atomic-scale analysis of lath martensite: Effect of the transformation sequence. *Acta Materialia*, **2015**, 95, 366-377	8.4	130
923	Non-equiatomic high entropy alloys: Approach towards rapid alloy screening and property-oriented design. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2015**, 648, 183-192	5.3	130
922	Interaction between recrystallization and phase transformation during intercritical annealing in a cold-rolled dual-phase steel: A cellular automaton model. *Acta Materialia*, **2013**, 61, 5504-5517	8.4	130
921	The effects of prior austenite grain boundaries and microstructural morphology on the impact toughness of intercritically annealed medium Mn steel. *Acta Materialia*, **2017**, 122, 199-206	8.4	130
920	The influence of sterilization processes on the micromechanical properties of carbon fiber-reinforced PEEK composites for bone implant applications. *Acta Biomaterialia*, **2007**, 3, 209-20	10.8	128
919	A crystal plasticity model for twinning- and transformation-induced plasticity. *Acta Materialia*, **2016**, 118, 140-151	8.4	127
918	On the influence of the grain boundary misorientation on the plastic deformation of aluminum bicrystals. *Acta Materialia*, **2003**, 51, 4719-4735	8.4	126
917	Development of microstructure and texture of medium carbon steel during heavy warm deformation. *Acta Materialia*, **2004**, 52, 2209-2220	8.4	124
916	Orientation informed nanoindentation of □itanium: Indentation pileup in hexagonal metals deforming by prismatic slip. *Journal of Materials Research*, **2012**, 27, 356-367	2.5	122
915	Alloy Design, Combinatorial Synthesis, and Microstructure□Property Relations for Low-Density Fe-Mn-Al-C Austenitic Steels. *Jom*, **2014**, 66, 1845-1856	2.1	121
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913	Atomic-scale insights into surface species of electrocatalysts in three dimensions. *Nature Catalysis*, **2018**, 1, 300-305	36.5	117
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908	Intrinsic and extrinsic size effects in the deformation of amorphous CuZr/nanocrystalline Cu nanolaminates. *Acta Materialia*, **2014**, 80, 94-106	8.4	114
907	From High-Entropy Alloys to High-Entropy Steels. *Steel Research International*, **2015**, 86, 1127-1138	1.6	114
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903	A hybrid model for mesoscopic simulation of recrystallization. *Computational Materials Science*, **2001**, 21, 69-78	3.2	112
902	Segregation assisted grain boundary precipitation in a model Al-Zn-Mg-Cu alloy. *Acta Materialia*, **2018**, 156, 318-329	8.4	112
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899	The exoskeleton of the lobster Homarus americanus as an example of a smart anisotropic biological material. *Acta Biomaterialia*, **2007**, 3, 301-9	10.8	110
898	Bidirectional Transformation Enables Hierarchical Nanolaminate Dual-Phase High-Entropy Alloys. *Advanced Materials*, **2018**, 30, e1804727	24	110
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896	In-situ SEM observation of phase transformation and twinning mechanisms in an interstitial high-entropy alloy. *Acta Materialia*, **2018**, 147, 236-246	8.4	108

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894	Strategies for improving the sustainability of structural metals. *Nature*, **2019**, 575, 64-74	50.4	106
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892	A microstructural investigation of adiabatic shear bands in an interstitial free steel. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **2007**, 457, 205-218	5.3	105
891	Deformation mechanism of β-enriched Ti–Nb-based gum metal: Dislocation channeling and deformation induced ω transformation. *Acta Materialia*, **2015**, 100, 290-300	8.4	104
890	Atomic scale effects of alloying, partitioning, solute drag and austempering on the mechanical properties of high-carbon bainitic–austenitic TRIP steels. *Acta Materialia*, **2012**, 60, 6183-6199	8.4	104
889	Rolling and Annealing Textures of BCC Metals. *Materials Science Forum*, **1994**, 157-162, 597-610	0.4	104
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887	Simulation of rolling textures of b.c.c. metals considering grain interactions and crystallographic slip on {110}, {112} and {123} planes. *Materials Science & Engineering A: Structural Materials: Properties, Microstructure and Processing*, **1995**, 197, 31-37	5.3	102
886	Strengthening and strain hardening mechanisms in a precipitation-hardened high-Mn lightweight steel. *Acta Materialia*, **2017**, 140, 258-273	8.4	101
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