

# Machine learning for alloys

Nature Reviews Materials

6, 730-755

DOI: [10.1038/s41578-021-00340-w](https://doi.org/10.1038/s41578-021-00340-w)

Citation Report

#	ARTICLE	IF	CITATIONS
1	Settling the matter of the role of vibrations in the stability of high-entropy carbides. <i>Nature Communications</i> , 2021, 12, 5747.	5.8	28
2	Materials Informatics for Mechanical Deformation: A Review of Applications and Challenges. <i>Materials</i> , 2021, 14, 5764.	1.3	20
3	Machine learning for next-generation nanotechnology in healthcare. <i>Matter</i> , 2021, 4, 3078-3080.	5.0	5
4	A machine learning-based alloy design system to facilitate the rational design of high entropy alloys with enhanced hardness. <i>Acta Materialia</i> , 2022, 222, 117431.	3.8	112
5	Machine learning and materials informatics approaches in the analysis of physical properties of carbon nanotubes: A review. <i>Computational Materials Science</i> , 2022, 201, 110939.	1.4	41
6	Prediction of Magnesium Alloy Corrosion Based on Machine Learning Method. <i>SSRN Electronic Journal</i> , 0, , .	0.4	0
7	Machine-Learning Prediction of Vegard's Law Factor and Volume Size Factor for Binary Substitutional Metallic Solid Solutions. <i>SSRN Electronic Journal</i> , 0, , .	0.4	0
8	Efficient parametrization of the atomic cluster expansion. <i>Physical Review Materials</i> , 2022, 6, .	0.9	23
9	Design high-entropy carbide ceramics from machine learning. <i>Npj Computational Materials</i> , 2022, 8, .	3.5	37
10	Predicting elastic properties of hard-coating alloys using ab-initio and machine learning methods. <i>Npj Computational Materials</i> , 2022, 8, .	3.5	16
11	Grain Knowledge Graph Representation Learning: A New Paradigm for Microstructure-Property Prediction. <i>Crystals</i> , 2022, 12, 280.	1.0	14
12	Phase transitions of zirconia: Machine-learned force fields beyond density functional theory. <i>Physical Review B</i> , 2022, 105, .	1.1	21
13	Using Feature-Assisted Machine Learning Algorithms to Boost Polarity in Lead-Free Multicomponent Niobate Alloys for High-Performance Ferroelectrics. <i>Advanced Science</i> , 2022, 9, e2104569.	5.6	11
14	Microstructure Representation Knowledge Graph to Explore the Twinning Formation. <i>Crystals</i> , 2022, 12, 466.	1.0	4
15	Recent advances in the application of machine-learning algorithms to predict adsorption energies. <i>Trends in Chemistry</i> , 2022, 4, 347-360.	4.4	4
16	Machine learning prediction of the mechanical properties of $\hat{1}^3$ -TiAl alloys produced using random forest regression model. <i>Journal of Materials Research and Technology</i> , 2022, 18, 520-530.	2.6	32
17	Electrical resistivity as a descriptor for classification of amorphous versus crystalline phases of alloys. <i>Acta Materialia</i> , 2022, 231, 117861.	3.8	15
18	Deep machine learning unravels the structural origin of mid-gap states in chalcogenide glass for high-density memory integration. <i>Informa-Materially</i> , 2022, 4, .	8.5	34

#	ARTICLE	IF	CITATIONS
19	A modified method for calculating the viscosity of multicomponent slags based on Kriging interpolation. <i>Ceramics International</i> , 2022, 48, 21803-21811.	2.3	3
20	Microstructural Evolution and Mechanical Properties of FCAW Joints in 9% Ni Steel Prepared with Two Types of Ni-Based Weld Metals. <i>International Journal of Advanced Manufacturing Technology</i> , 2022, 120, 6735-6746.	1.5	3
21	Preparation and property optimization of FeCrAl-based ODS alloy by machine learning combined with wedge-shaped hot-rolling. <i>Materials Characterization</i> , 2022, 188, 111894.	1.9	15
22	Data-Driven Materials Innovation and Applications. <i>Advanced Materials</i> , 2022, 34, e2104113.	11.1	51
23	Atomistic and machine learning studies of solute segregation in metastable grain boundaries. <i>Scientific Reports</i> , 2022, 12, 6673.	1.6	11
24	Perspectives in the new era of materials intelligent design. , 0, 1, .		2
25	Insights on phase formation from thermodynamic calculations and machine learning of 2436 experimentally measured high entropy alloys. <i>Journal of Alloys and Compounds</i> , 2022, 915, 165173.	2.8	10
26	Materials Data toward Machine Learning: Advances and Challenges. <i>Journal of Physical Chemistry Letters</i> , 2022, 13, 3965-3977.	2.1	12
27	Composition design of high-entropy alloys with deep sets learning. <i>Npj Computational Materials</i> , 2022, 8, .	3.5	22
28	Machine Learning Interatomic Potential for High-Throughput Screening of High-Entropy Alloys. <i>Jom</i> , 2022, 74, 2908-2920.	0.9	2
29	Machine-Learning-Based phase diagram construction for high-throughput batch experiments. <i>Science and Technology of Advanced Materials Methods</i> , 2022, 2, 153-161.	0.4	3
30	Prediction of Phase Diagrams and Associated Phase Structural Properties. <i>Industrial &amp; Engineering Chemistry Research</i> , 2022, 61, 8378-8389.	1.8	3
31	Screening for shape memory alloys with narrow thermal hysteresis using combined XGBoost and DFT calculation. <i>Computational Materials Science</i> , 2022, 211, 111519.	1.4	4
32	Machine Learning Force Field Aided Cluster Expansion Approach to Configurationally Disordered Materials: Critical Assessment of Training Set Selection and Size Convergence. <i>Journal of Chemical Theory and Computation</i> , 2022, 18, 3795-3804.	2.3	6
33	Machine learning for design principles for single atom catalysts towards electrochemical reactions. <i>Journal of Materials Chemistry A</i> , 2022, 10, 15309-15331.	5.2	28
34	Creep rupture life prediction of nickel-based superalloys based on data fusion. <i>Computational Materials Science</i> , 2022, 211, 111560.	1.4	13
35	Prediction of Mg Alloy Corrosion Based on Machine Learning Models. <i>Advances in Materials Science and Engineering</i> , 2022, 2022, 1-8.	1.0	6
36	Prediction of stable Li-Sn compounds: boosting ab initio searches with neural network potentials. <i>Npj Computational Materials</i> , 2022, 8, .	3.5	7

#	ARTICLE	IF	CITATIONS
37	Data-Driven Construction Method of Material Mechanical Behavior Model. <i>Metals</i> , 2022, 12, 1086.	1.0	1
38	Thermodynamically-guided machine learning modelling for predicting the glass-forming ability of bulk metallic glasses. <i>Scientific Reports</i> , 2022, 12, .	1.6	3
39	Machine-learning prediction of Vegard's law factor and volume size factor for binary substitutional metallic solid solutions. <i>Acta Materialia</i> , 2022, 237, 118166.	3.8	5
40	The Use of Machine Learning Model in the Evaluation of College Students's Employment and Entrepreneurship Level. <i>Wireless Communications and Mobile Computing</i> , 2022, 2022, 1-10.	0.8	5
41	A comparison of explainable artificial intelligence methods in the phase classification of multi-principal element alloys. <i>Scientific Reports</i> , 2022, 12, .	1.6	10
42	Electron-phonon coupling strength from <i>ab initio</i> frozen-phonon approach. <i>Physical Review Materials</i> , 2022, 6, .	0.9	10
43	Crystal Structure Prediction via Efficient Sampling of the Potential Energy Surface. <i>Accounts of Chemical Research</i> , 2022, 55, 2068-2076.	7.6	18
44	High-throughput Generation of 3D Graphene Metamaterials and Property Quantification Using Machine Learning. <i>Small Methods</i> , 2022, 6, .	4.6	12
46	ML-guided design and screening of chalcogenide catalysts for hydrogen evolution reaction. <i>International Journal of Hydrogen Energy</i> , 2022, 47, 31321-31329.	3.8	6
47	Self-adaptable materials structure descriptor based on graph attention network for machine learning. <i>Materials and Design</i> , 2022, 223, 111162.	3.3	1
48	A feasibility study of machine learning-assisted alloy design using wrought aluminum alloys as an example. <i>Computational Materials Science</i> , 2022, 215, 111783.	1.4	8
49	Machine learning for high-entropy alloys: Progress, challenges and opportunities. <i>Progress in Materials Science</i> , 2023, 131, 101018.	16.0	54
50	Spinel nitride solid solutions: charting properties in the configurational space with explainable machine learning. , 2022, 1, 665-678.		1
51	Reversible assembly of nanoparticles: theory, strategies and computational simulations. <i>Nanoscale</i> , 2022, 14, 14385-14432.	2.8	14
52	Machine learning prediction on intermetallic compounds with implemented virtual-center-atom structural descriptor. <i>Science and Technology of Advanced Materials Methods</i> , 2022, 2, 334-344.	0.4	0
53	Experimental study and machine learning model to predict formability of magnesium alloy sheet. <i>F1000Research</i> , 0, 11, 1118.	0.8	1
54	Machine Learning for Harnessing Thermal Energy: From Materials Discovery to System Optimization. <i>ACS Energy Letters</i> , 2022, 7, 3204-3226.	8.8	11
55	Correlation between microstructure and mechanical properties of welding joint in 9% Ni steel with two types of Ni-based superalloy filler metals. <i>International Journal of Advanced Manufacturing Technology</i> , 2022, 122, 2761-2773.	1.5	1

#	ARTICLE	IF	CITATIONS
56	Perspective on optimal strategies of building cluster expansion models for configurationally disordered materials. <i>Journal of Chemical Physics</i> , 2022, 157, .	1.2	4
57	A Knowledge Transfer Framework for General Alloy Materials Properties Prediction. <i>Materials</i> , 2022, 15, 7442.	1.3	1
58	Controlled Synthesis of Multicolor Carbon Dots Assisted by Machine Learning. <i>Advanced Functional Materials</i> , 2023, 33, .	7.8	16
59	Crucial feature space for ductile bcc high-entropy alloys. <i>Applied Physics Letters</i> , 2022, 121, .	1.5	2
60	Artificial intelligence automates the characterization of reversibly actuating planar-flow-casted NiTi shape memory alloy foil. <i>PLoS ONE</i> , 2022, 17, e0275485.	1.1	3
61	Machine learning versus human learning in predicting glass-forming ability of metallic glasses. <i>Acta Materialia</i> , 2023, 243, 118497.	3.8	14
62	Multilayer atomic cluster expansion for semilocal interactions. <i>Physical Review Research</i> , 2022, 4, .	1.3	8
63	Designing catalysts via evolutionary-based optimization techniques. <i>Computational Materials Science</i> , 2023, 216, 111833.	1.4	4
64	Rational Design for Efficient Bifunctional Oxygen Electrocatalysts by Artificial Intelligence. <i>Journal of Physical Chemistry C</i> , 2022, 126, 19091-19100.	1.5	1
65	Toward autonomous laboratories: Convergence of artificial intelligence and experimental automation. <i>Progress in Materials Science</i> , 2023, 132, 101043.	16.0	19
66	Data-driven pitting evolution prediction for corrosion-resistant alloys by time-series analysis. <i>Npj Materials Degradation</i> , 2022, 6, .	2.6	7
67	Phase Stability Through Machine Learning. <i>Journal of Phase Equilibria and Diffusion</i> , 2022, 43, 606-628.	0.5	2
68	Machine learning of carbon vacancy formation energy in high-entropy carbides. <i>Journal of the European Ceramic Society</i> , 2023, 43, 1315-1321.	2.8	6
69	Design of Light-Metal Alloys Using Machine Learning Techniques. <i>Materials Horizons</i> , 2023, , 3-24.	0.3	0
70	Machine learning assisted design of aluminum-lithium alloy with high specific modulus and specific strength. <i>Materials and Design</i> , 2023, 225, 111483.	3.3	13
71	Interpretable machine learning workflow for evaluation of the transformation temperatures of TiZrHfNiCoCu high entropy shape memory alloys. <i>Materials and Design</i> , 2023, 225, 111513.	3.3	8
72	Hardness Predicting of Additively Manufactured High-Entropy Alloys Based on Fabrication Parameter-Dependent Machine Learning. <i>Advanced Engineering Materials</i> , 0, , 2201369.	1.6	0
73	Exploiting Machine Learning in Multiscale Modelling of Materials. <i>Journal of the Institution of Engineers (India): Series D</i> , 0, , .	0.6	2

#	ARTICLE	IF	CITATIONS
74	A Neural Network Approach to Predict Gibbs Free Energy of Ternary Solid Solutions. <i>Journal of Phase Equilibria and Diffusion</i> , 2022, 43, 916-930.	0.5	0
75	Prediction of mechanical properties for deep drawing steel by deep learning. <i>International Journal of Minerals, Metallurgy and Materials</i> , 2023, 30, 156-165.	2.4	4
76	Evolutionary computation-based machine learning for Smart City high-dimensional Big Data Analytics. <i>Applied Soft Computing Journal</i> , 2023, 133, 109955.	4.1	3
77	Element-wise representations with ECNet for material property prediction and applications in high-entropy alloys. <i>Npj Computational Materials</i> , 2022, 8, .	3.5	3
78	Gaussian process regressions on hot deformation behaviors of FGH98 nickel-based powder superalloy. <i>Journal of Materials Science and Technology</i> , 2023, 146, 177-185.	5.6	10
79	A deep transfer learning-based protocol accelerates full quantum mechanics calculation of protein. <i>Briefings in Bioinformatics</i> , 2023, 24, .	3.2	3
80	Accelerated design of electrodes for liquid metal battery by machine learning. <i>Energy Storage Materials</i> , 2023, 56, 205-217.	9.5	8
81	Data Augmentation of Micrographs and Prediction of Impact Toughness for Cast Austenitic Steel by Machine Learning. <i>Metals</i> , 2023, 13, 107.	1.0	1
82	Machine learning based nonlinear adaptive optimal control of capacitive micro-actuator subjected to electrostatic field. <i>Journal of the Brazilian Society of Mechanical Sciences and Engineering</i> , 2023, 45, .	0.8	0
83	Classification of Wall Following Robot Movements Using Genetic Programming Symbolic Classifier. <i>Machines</i> , 2023, 11, 105.	1.2	3
84	Ensemble Learning for Predicting the Tensile Strength of Alloy Steels from Chemical Composition and Processing Parameters. , 2022, , .		0
85	Data-driven design of electrocatalysts: principle, progress, and perspective. <i>Journal of Materials Chemistry A</i> , 2023, 11, 3849-3870.	5.2	8
86	A generative deep learning framework for inverse design of compositionally complex bulk metallic glasses. <i>Npj Computational Materials</i> , 2023, 9, .	3.5	10
87	Corrosion-Resistant Coating Based on High-Entropy Alloys. <i>Metals</i> , 2023, 13, 205.	1.0	7
88	A critical examination of robustness and generalizability of machine learning prediction of materials properties. <i>Npj Computational Materials</i> , 2023, 9, .	3.5	16
89	Rational design of high-entropy ceramics based on machine learning â€” A critical review. <i>Current Opinion in Solid State and Materials Science</i> , 2023, 27, 101057.	5.6	6
90	Machine learning in coastal bridge hydrodynamics: A state-of-the-art review. <i>Applied Ocean Research</i> , 2023, 134, 103511.	1.8	8
91	Graph neural networks predict energetic and mechanical properties for models of solid solution metal alloy phases. <i>Computational Materials Science</i> , 2023, 224, 112141.	1.4	3

#	ARTICLE	IF	CITATIONS
92	Active learning sensitivity analysis of L <sub>12</sub> precipitate morphology of ternary co-based superalloys. <i>Materialia</i> , 2023, 28, 101760.	1.3	0
93	Knowledge-aware design of high-strength aviation aluminum alloys via machine learning. <i>Journal of Materials Research and Technology</i> , 2023, 24, 346-361.	2.6	10
94	Machine learning assisted advanced battery thermal management system: A state-of-the-art review. <i>Journal of Energy Storage</i> , 2023, 60, 106688.	3.9	12
95	A State-of-the-Art Review on Prediction Model for Fatigue Performance of Welded Joints via Data-Driven Method. <i>Advanced Engineering Materials</i> , 2023, 25, .	1.6	3
96	Unsupervised machine learning discovers classes in aluminium alloys. <i>Royal Society Open Science</i> , 2023, 10, .	1.1	5
97	A machine learning study of grain boundary damage in Mg alloy. <i>Materials Science &amp; Engineering A: Structural Materials: Properties, Microstructure and Processing</i> , 2023, 867, 144721.	2.6	1
98	A Critical Review of Machine Learning Techniques on Thermoelectric Materials. <i>Journal of Physical Chemistry Letters</i> , 2023, 14, 1808-1822.	2.1	9
99	Machine Learning for Perovskite Solar Cells and Component Materials: Key Technologies and Prospects. <i>Advanced Functional Materials</i> , 2023, 33, .	7.8	19
100	Machine Learning Interatomic Potentials and Long-Range Physics. <i>Journal of Physical Chemistry A</i> , 2023, 127, 2417-2431.	1.1	19
102	Prediction of phase selection of amorphous alloys and high entropy alloys by artificial neural network. <i>Computational Materials Science</i> , 2023, 223, 112129.	1.4	2
103	Improving machine learning based phase and hardness prediction of high-entropy alloys by using Gaussian noise augmented data. <i>Computational Materials Science</i> , 2023, 223, 112140.	1.4	7
104	Comprehensive ab initio study of effects of alloying elements on generalized stacking fault energies of Ni and $\text{Ni}_3$ . <i>Physical Review Materials</i> , 2023, 7, .	0.9	0
105	Lithium-ion battery thermal management via advanced cooling parameters: State-of-the-art review on application of machine learning with exergy, economic and environmental analysis. <i>Journal of the Taiwan Institute of Chemical Engineers</i> , 2023, 148, 104854.	2.7	3
106	Application of machine learning to guide efficient metal leaching from spent lithium-ion batteries and comprehensively reveal the process parameter influences. <i>Journal of Cleaner Production</i> , 2023, 410, 137188.	4.6	3
107	Representations of Materials for Machine Learning. <i>Annual Review of Materials Research</i> , 2023, 53, 399-426.	4.3	6
108	Advances in machine learning- and artificial intelligence-assisted material design of steels. <i>International Journal of Minerals, Metallurgy and Materials</i> , 2023, 30, 1003-1024.	2.4	14
109	Artificial Intelligence in Physical Sciences: Symbolic Regression Trends and Perspectives. <i>Archives of Computational Methods in Engineering</i> , 2023, 30, 3845-3865.	6.0	13
110	CoSMoR: Decoding decision-making process along continuous composition pathways in machine learning models trained for material properties. <i>Physical Review Materials</i> , 2023, 7, .	0.9	1

#	ARTICLE	IF	CITATIONS
129	Microstructure, Microhardness and Tribological Properties of Electrodeposited Ni-Co Based Particle Reinforced Composite Coatings. <i>Materials Horizons</i> , 2023, , 359-395.	0.3	0
130	A Review on Nickel Composite Coatings Deposited by Jet Electrodeposition. <i>Materials Horizons</i> , 2023, , 333-358.	0.3	2
137	Research Study: Data Preprocessing Using Machine Learning for Prediction of Booking Cancellations. <i>Communications in Computer and Information Science</i> , 2023, , 164-182.	0.4	0
147	Machine Learning-Assisted Low-Dimensional Electrocatalysts Design for Hydrogen Evolution Reaction. <i>Nano-Micro Letters</i> , 2023, 15, .	14.4	7
156	Neural Networks for Constitutive Modeling: From Universal Function Approximators to Advanced Models and the Integration of Physics. <i>Archives of Computational Methods in Engineering</i> , 2024, 31, 1097-1127.	6.0	2
169	Artificial intelligence-powered electronic skin. <i>Nature Machine Intelligence</i> , 2023, 5, 1344-1355.	8.3	4
183	Fuzzy Mathematical Reliability Modeling Based on Robustness Analysis. , 2023, , .		0
185	Nucleation and growth of metallic crystals in metallurgy and materials processing. , 2024, , 101-118.		0
192	AFLOW for Alloys. <i>Journal of Phase Equilibria and Diffusion</i> , 0, , .	0.5	0