Markus J Buehler

List of Publications by Year in descending order

550 papers	37,253 citations	1883 102 h-index	4419 172 g-index
564 all docs	564 docs citations	564 times ranked	30820 citing authors

#	Article	IF	Citations
1	Nanoconfinement controls stiffness, strength and mechanical toughness of Î²-sheet crystals in silk. Nature Materials, 2010, 9, 359-367.	13.3	1,131
2	Current issues in research on structureâ€“property relationships in polymer nanocomposites. Polymer, 2010, 51, 3321-3343.	1.8	773
3	Multifunctionality and control of the crumpling and unfolding of large-area graphene. Nature Materials, 2013, 12, 321-325.	13.3	735
4	A realistic molecular model of cement hydrates. Proceedings of the National Academy of Sciences of the United States of America, 2009, 106, 16102-16107.	3.3	734
5	Nanomechanics of functional and pathological amyloid materials. Nature Nanotechnology, 2011, 6, 469-479.	15.6	703
6	Merger of structure and material in nacre and bone â€“ Perspectives on de novo biomimetic materials. Progress in Materials Science, 2009, 54, 1059-1100.	16.0	659
7	Nature designs tough collagen: Explaining the nanostructure of collagen fibrils. Proceedings of the National Academy of Sciences of the United States of America, 2006, 103, 12285-12290.	3.3	640
8	On the Mechanistic Origins of Toughness in Bone. Annual Review of Materials Research, 2010, 40, 25-53.	4.3	560
9	Hierarchical Structure and Nanomechanics of Collagen Microfibrils from the Atomistic Scale Up. Nano Letters, 2011, 11, 757-766.	4.5	550
10	Polydopamine and Eumelanin: From Structureâ€“Property Relationships to a Unified Tailoring Strategy. Accounts of Chemical Research, 2014, 47, 3541-3550.	7.6	514
11	Structure and mechanics of interfaces in biological materials. Nature Reviews Materials, 2016, 1, .	23.3	486
12	Nanofibrils in nature and materials engineering. Nature Reviews Materials, 2018, 3, .	23.3	455
13	Tuning the Mechanical Properties of Graphene Oxide Paper and Its Associated Polymer Nanocomposites by Controlling Cooperative Intersheet Hydrogen Bonding. ACS Nano, 2012, 6, 2008-2019.	7.3	409
14	Mechanical properties of graphyne. Carbon, 2011, 49, 4111-4121.	5.4	385
15	Nonlinear material behaviour of spider silk yields robust webs. Nature, 2012, 482, 72-76.	13.7	383
16	Molecular mechanics of mineralized collagen fibrils in bone. Nature Communications, 2013, 4, 1724.	5.8	381
17	Molecular and Nanostructural Mechanisms of Deformation, Strength and Toughness of Spider Silk Fibrils. Nano Letters, 2010, 10, 2626-2634.	4.5	362
18	Combinatorial molecular optimization of cement hydrates. Nature Communications, 2014, 5, 4960.	5.8	358

#	Article	IF	Citations
19	Bioinspired hierarchical composite design using machine learning: simulation, additive manufacturing, and experiment. Materials Horizons, 2018, 5, 939-945.	6.4	354
20	The mechanics and design of a lightweight three-dimensional graphene assembly. Science Advances, 2017, 3, e1601536.	4.7	331
21	Nanomechanics of collagen fibrils under varying cross-link densities: Atomistic and continuum studies. Journal of the Mechanical Behavior of Biomedical Materials, 2008, 1, 59-67.	1.5	317
22	Biopolymer nanofibrils: Structure, modeling, preparation, and applications. Progress in Polymer Science, 2018, 85, 1-56.	11.8	312
23	Tough Composites Inspired by Mineralized Natural Materials: Computation, 3D printing, and Testing. Advanced Functional Materials, 2013, 23, 4629-4638.	7.8	310
24	Deformation and failure of protein materials in physiologically extreme conditions and disease. Nature Materials, 2009, 8, 175-188.	13.3	307
25	De novo composite design based on machine learning algorithm. Extreme Mechanics Letters, 2018, 18, 19-28.	2.0	306
26	Influence of cross-link structure, density and mechanical properties in the mesoscale deformation mechanisms of collagen fibrils. Journal of the Mechanical Behavior of Biomedical Materials, 2015, 52, 1-13.	1.5	300
27	Hyperelasticity governs dynamic fracture at a critical length scale. Nature, 2003, 426, 141-146.	13.7	292
28	Plasticity and toughness in bone. Physics Today, 2009, 62, 41-47.	0.3	281
29	Hierarchically Enhanced Impact Resistance of Bioinspired Composites. Advanced Materials, 2017, 29, 1700060.	11.1	259
30	Atomistic and continuum modeling of mechanical properties of collagen: Elasticity, fracture, and self-assembly. Journal of Materials Research, 2006, 21, 1947-1961.	1.2	256
31	Dynamical fracture instabilities due to local hyperelasticity at crack tips. Nature, 2006, 439, 307-310.	13.7	251
32	Molecular nanomechanics of nascent bone: fibrillar toughening by mineralization. Nanotechnology, 2007, 18, 295102.	1.3	243
33	Artificial intelligence and machine learning in design of mechanical materials. Materials Horizons, 2021, 8, 1153-1172.	6.4	237
34	Nanostructure and molecular mechanics of spider dragline silk protein assemblies. Journal of the Royal Society Interface, 2010, 7, 1709-1721.	1.5	234
35	Geometry Controls Conformation of Graphene Sheets: Membranes, Ribbons, and Scrolls. ACS Nano, 2010, 4, 3869-3876.	7.3	227
36	Nanoconfinement of Spider Silk Fibrils Begets Superior Strength, Extensibility, and Toughness. Nano Letters, 2011, 11, 5038-5046.	4.5	222

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37	Design and function of biomimetic multilayer water purification membranes. Science Advances, 2017, 3, e1601939.	4.7	221
38	Multiparadigm Modeling of Dynamical Crack Propagation in Silicon Using a Reactive Force Field. Physical Review Letters, 2006, 96, 095505.	2.9	214
39	Geometric Confinement Governs the Rupture Strength of H-bond Assemblies at a Critical Length Scale. Nano Letters, 2008, 8, 743-748.	4.5	213
40	Fracture mechanics of protein materials. Materials Today, 2007, 10, 46-58.	8.3	209
41	Polymorphic regenerated silk fibers assembled through bioinspired spinning. Nature Communications, 2017, 8, 1387.	5.8	208
42	Nanoengineering Heat Transfer Performance at Carbon Nanotube Interfaces. ACS Nano, 2009, 3, 2767-2775.	7.3	207
43	Interface structure and mechanics between graphene and metal substrates: a first-principles study. Journal of Physics Condensed Matter, 2010, 22, 485301.	0.7	206
44	Structureâ€“functionâ€“propertyâ€“design interplay in biopolymers: Spider silk. Acta Biomaterialia, 2014, 10, 1612-1626.	4.1	206
45	Selective hydrogen purification through graphdiyne under ambient temperature and pressure. Nanoscale, 2012, 4, 4587.	2.8	194
46	Hierarchies, multiple energy barriers, and robustness govern the fracture mechanics of Î±-helical and Î²-sheet protein domains. Proceedings of the National Academy of Sciences of the United States of America, 2007, 104, 16410-16415.	3.3	193
47	Firstâ€Principles Study of Elastic Constants and Interlayer Interactions of Complex Hydrated Oxides: Case Study of Tobermorite and Jennite. Journal of the American Ceramic Society, 2009, 92, 2323-2330.	1.9	190
48	Hydration of Calcium Oxide Surface Predicted by Reactive Force Field Molecular Dynamics. Langmuir, 2012, 28, 4187-4197.	1.6	190
49	Entropic Elasticity Controls Nanomechanics of Single Tropocollagen Molecules. Biophysical Journal, 2007, 93, 37-43.	0.2	189
50	Paraffin-enabled graphene transfer. Nature Communications, 2019, 10, 867.	5.8	185
51	Molecular level detection and localization of mechanical damage in collagen enabled by collagen hybridizing peptides. Nature Communications, 2017, 8, 14913.	5.8	183
52	Meso-origami: Folding multilayer graphene sheets. Applied Physics Letters, 2009, 95, .	1.5	181
53	Mesoscale modeling of mechanics of carbon nanotubes: Self-assembly, self-folding, and fracture. Journal of Materials Research, 2006, 21, 2855-2869.	1.2	179
54	Theoretical and computational hierarchical nanomechanics of protein materials: Deformation and fracture. Progress in Materials Science, 2008, 53, 1101-1241.	16.0	168

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55	Extended graphynes: simple scaling laws for stiffness, strength and fracture. Nanoscale, 2012, 4, 7797.	2.8	167
56	Osmotic pressure induced tensile forces in tendon collagen. Nature Communications, 2015, 6, 5942.	5.8	167
57	Hierarchical Structure Controls Nanomechanical Properties of Vimentin Intermediate Filaments. PLoS ONE, 2009, 4, e7294.	1.1	163
58	Tearing Graphene Sheets From Adhesive Substrates Produces Tapered Nanoribbons. Small, 2010, 6, 1108-1116.	5.2	163
59	Structural hierarchies define toughness and defect-tolerance despite simple and mechanically inferior brittle building blocks. Scientific Reports, 2011, 1, 35.	1.6	163
60	Polydopamine and eumelanin molecular structures investigated with ab initio calculations. Chemical Science, 2017, 8, 1631-1641.	3.7	162
61	Protective role of Arapaima gigas fish scales: Structure and mechanical behavior. Acta Biomaterialia, 2014, 10, 3599-3614.	4.1	161
62	Deformation rate controls elasticity and unfolding pathway of single tropocollagen molecules. Journal of the Mechanical Behavior of Biomedical Materials, 2009, 2, 130-137.	1.5	155
63	Integration of Stiff Graphene and Tough Silk for the Design and Fabrication of Versatile Electronic Materials. Advanced Functional Materials, 2018, 28, 1705291.	7.8	148
64	Transition-metal coordinate bonds for bioinspired macromolecules with tunable mechanical properties. Nature Reviews Materials, 2021, 6, 421-436.	23.3	148
65	Ultrathin Free-Standing <i>Bombyx mori</i> Silk Nanofibril Membranes. Nano Letters, 2016, 16, 3795-3800.	4.5	146
66	Self-Assembly of Tetramers of 5,6-Dihydroxyindole Explains the Primary Physical Properties of Eumelanin: Experiment, Simulation, and Design. ACS Nano, 2013, 7, 1524-1532.	7.3	145
67	Viscoelastic properties of model segments of collagen molecules. Matrix Biology, 2012, 31, 141-149.	1.5	144
68	Ultrathin thermoresponsive self-folding 3D graphene. Science Advances, 2017, 3, e1701084.	4.7	144
69	Mechanical exfoliation of two-dimensional materials. Journal of the Mechanics and Physics of Solids, 2018, 115, 248-262.	2.3	143
70	Deposition Mechanism and Properties of Thin Polydopamine Films for High Added Value Applications in Surface Science at the Nanoscale. BioNanoScience, 2012, 2, 16-34.	1.5	139
71	Boneâ€Inspired Materials by Design: Toughness Amplification Observed Using 3D Printing and Testing. Advanced Engineering Materials, 2016, 18, 1354-1363.	1.6	138
72	Structural solution using molecular dynamics: Fundamentals and a case study of epoxy-silica interface. International Journal of Solids and Structures, 2011, 48, 2131-2140.	1.3	137

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73	Geometric confinement governs the rupture strength of H-bond assemblies at a critical length scale. Materials Research Society Symposia Proceedings, 2007, 1061, 1.	0.1	136
74	Molecular Dynamics Simulation of the<mml:math xmlns:mml="http://www.w3.org/1998/Math/MathML" display="inline"><mml:mi>Î±</mml:mi></mml:math>-Helix to<mml:math xmlns:mml="http://www.w3.org/1998/Math/MathML" display="inline"><mml:mi>Î²</mml:mi></mml:math>-Sheet Transition in Coiled Protein Filaments: Evidence for a Critical Filament Length Scale. Physical Review Letters, 2010, 104, 198304.	2.9	136
75	Structural optimization of 3D-printed synthetic spider webs for high strength. Nature Communications, 2015, 6, 7038.	5.8	136
76	Mechanics and molecular filtration performance of graphyne nanoweb membranes for selective water purification. Nanoscale, 2013, 5, 11801.	2.8	135
77	Materiomics: An â€<i>omics</i> Approach to Biomaterials Research. Advanced Materials, 2013, 25, 802-824.	11.1	134
78	Liquid Exfoliated Natural Silk Nanofibrils: Applications in Optical and Electrical Devices. Advanced Materials, 2016, 28, 7783-7790.	11.1	134
79	The hidden structure of human enamel. Nature Communications, 2019, 10, 4383.	5.8	134
80	Highâ€Strength, Durable Allâ€Silk Fibroin Hydrogels with Versatile Processability toward Multifunctional Applications. Advanced Functional Materials, 2018, 28, 1704757.	7.8	133
81	Strain controlled thermomutability of single-walled carbon nanotubes. Nanotechnology, 2009, 20, 185701.	1.3	130
82	Atomically Sharp Crack Tips in Monolayer MoS₂ and Their Enhanced Toughness by Vacancy Defects. ACS Nano, 2016, 10, 9831-9839.	7.3	130
83	The Rise of Hierarchical Nanostructured Materials from Renewable Sources: Learning from Nature. ACS Nano, 2018, 12, 7425-7433.	7.3	128
84	Excitonic effects from geometric order and disorder explain broadband optical absorption in eumelanin. Nature Communications, 2014, 5, 3859.	5.8	127
85	Deep learning model to predict complex stress and strain fields in hierarchical composites. Science Advances, 2021, 7, .	4.7	127
86	Biomimetic additive manufactured polymer composites for improved impact resistance. Extreme Mechanics Letters, 2016, 9, 317-323.	2.0	125
87	Molecular and Mesoscale Mechanisms of Osteogenesis Imperfecta Disease in Collagen Fibrils. Biophysical Journal, 2009, 97, 857-865.	0.2	123
88	Threshold Crack Speed Controls Dynamical Fracture of Silicon Single Crystals. Physical Review Letters, 2007, 99, 165502.	2.9	121
89	Biological Material Interfaces as Inspiration for Mechanical and Optical Material Designs. Chemical Reviews, 2019, 119, 12279-12336.	23.0	121
90	Melanin Biopolymers: Tailoring Chemical Complexity for Materials Design. Angewandte Chemie - International Edition, 2020, 59, 11196-11205.	7.2	121

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91	Alzheimer's Aî²(1-40) Amyloid Fibrils Feature Size-Dependent Mechanical Properties. Biophysical Journal, 2010, 98, 2053-2062.	0.2	120
92	Printing nature: Unraveling the role of nacre's mineral bridges. Journal of the Mechanical Behavior of Biomedical Materials, 2017, 76, 135-144.	1.5	119
93	Predictive modelling-based design and experiments for synthesis and spinning of bioinspired silk fibres. Nature Communications, 2015, 6, 6892.	5.8	118
94	Molecular mechanics of polycrystalline graphene with enhanced fracture toughness. Extreme Mechanics Letters, 2015, 2, 52-59.	2.0	118
95	Tu(r)ning weakness to strength. Nano Today, 2010, 5, 379-383.	6.2	117
96	Deformation micromechanisms of collagen fibrils under uniaxial tension. Journal of the Royal Society Interface, 2010, 7, 839-850.	1.5	113
97	Structural and Mechanical Differences between Collagen Homo- and Heterotrimers: Relevance for the Molecular Origin of Brittle Bone Disease. Biophysical Journal, 2012, 102, 640-648.	0.2	113
98	Age- and diabetes-related nonenzymatic crosslinks in collagen fibrils: Candidate amino acids involved in Advanced Glycation End-products. Matrix Biology, 2014, 34, 89-95.	1.5	113
99	Deformation Mechanisms of Very Long Single-Wall Carbon Nanotubes Subject to Compressive Loading. Journal of Engineering Materials and Technology, Transactions of the ASME, 2004, 126, 245-249.	0.8	111
100	Modeling and additive manufacturing of bio-inspired composites with tunable fracture mechanical properties. Soft Matter, 2014, 10, 4436.	1.2	111
101	Packing efficiency and accessible surface area of crumpled graphene. Physical Review B, 2011, 84, .	1.1	110
102	Additive Manufacturing Approaches for Hydroxyapatiteâ€Reinforced Composites. Advanced Functional Materials, 2019, 29, 1903055.	7.8	109
103	Spider dragline silk as torsional actuator driven by humidity. Science Advances, 2019, 5, eaau9183.	4.7	108
104	Dynamic pigmentary and structural coloration within cephalopod chromatophore organs. Nature Communications, 2019, 10, 1004.	5.8	105
105	Thickness of Hydroxyapatite Nanocrystal Controls Mechanical Properties of the Collagenâ€"Hydroxyapatite Interface. Langmuir, 2012, 28, 1982-1992.	1.6	103
106	Bio-Inspired Carbon Nanotubeâ€"Polymer Composite Yarns with Hydrogen Bond-Mediated Lateral Interactions. ACS Nano, 2013, 7, 3434-3446.	7.3	103
107	Advanced Structural Materials by Bioinspiration. Advanced Engineering Materials, 2017, 19, 1600787.	1.6	103
108	Twisted and coiled ultralong multilayer graphene ribbons. Modelling and Simulation in Materials Science and Engineering, 2011, 19, 054003.	0.8	100

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109	Printing of stretchable silk membranes for strain measurements. Lab on A Chip, 2016, 16, 2459-2466.	3.1	99
110	Design and Fabrication of Silk Templated Electronic Yarns and Applications in Multifunctional Textiles. Matter, 2019, 1, 1411-1425.	5.0	98
111	Sub-nanometre channels embedded in two-dimensional materials. Nature Materials, 2018, 17, 129-133.	13.3	97
112	Coarse-Grained Model of Collagen Molecules Using an Extended MARTINI Force Field. Journal of Chemical Theory and Computation, 2010, 6, 1210-1218.	2.3	94
113	<i>In silico</i>assembly and nanomechanical characterization of carbon nanotube buckypaper. Nanotechnology, 2010, 21, 265706.	1.3	93
114	Molecular biomechanics of collagen molecules. Materials Today, 2014, 17, 70-76.	8.3	93
115	Using Deep Learning to Predict Fracture Patterns in Crystalline Solids. Matter, 2020, 3, 197-211.	5.0	93
116	The effect of non-covalent functionalization on the thermal conductance of graphene/organic interfaces. Nanotechnology, 2013, 24, 165702.	1.3	92
117	Electrospinning Piezoelectric Fibers for Biocompatible Devices. Advanced Healthcare Materials, 2020, 9, e1901287.	3.9	90
118	Cyclic tensile strain triggers a sequence of autocrine and paracrine signaling to regulate angiogenic sprouting in human vascular cells. Proceedings of the National Academy of Sciences of the United States of America, 2009, 106, 15279-15284.	3.3	89
119	Three-Dimensional-Printing of Bio-Inspired Composites. Journal of Biomechanical Engineering, 2016, 138, 021006.	0.6	89
120	Atomistic simulation of nanomechanical properties of Alzheimerâ€™s AÎ²(1â€"40) amyloid fibrils under compressive and tensile loading. Journal of Biomechanics, 2010, 43, 1196-1201.	0.9	87
121	A Constitutive Model of Soft Tissue: From Nanoscale Collagen to Tissue Continuum. Annals of Biomedical Engineering, 2009, 37, 1117-1130.	1.3	86
122	Mechanism of friction in rotating carbon nanotube bearings. Journal of the Mechanics and Physics of Solids, 2013, 61, 652-673.	2.3	86
123	Silkâ€"Its Mysteries, How It Is Made, and How It Is Used. ACS Biomaterials Science and Engineering, 2015, 1, 864-876.	2.6	85
124	Tensan Silk-Inspired Hierarchical Fibers for Smart Textile Applications. ACS Nano, 2018, 12, 6968-6977.	7.3	85
125	A Self-Consistent Sonification Method to Translate Amino Acid Sequences into Musical Compositions and Application in Protein Design Using Artificial Intelligence. ACS Nano, 2019, 13, 7471-7482.	7.3	85
126	Atomistic model of the spider silk nanostructure. Applied Physics Letters, 2010, 96, .	1.5	84

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127	Remarkably Distinct Mechanical Flexibility in Three Structurally Similar Semiconducting Organic Crystals Studied by Nanoindentation and Molecular Dynamics. Chemistry of Materials, 2019, 31, 1391-1402.	3.2	84
128	Molecular structure, mechanical behavior and failure mechanism of the C-terminal cross-link domain in type I collagen. Journal of the Mechanical Behavior of Biomedical Materials, 2011, 4, 153-161.	1.5	83
129	Design of Multistimuli Responsive Hydrogels Using Integrated Modeling and Genetically Engineered Silkâ€“Elastinâ€Like Proteins. Advanced Functional Materials, 2016, 26, 4113-4123.	7.8	83
130	Mechanomutable properties of a PAA/PAH polyelectrolyte complex: rate dependence and ionization effects on tunable adhesion strength. Soft Matter, 2010, 6, 4175.	1.2	82
131	Molecular deformation mechanisms of the wood cell wall material. Journal of the Mechanical Behavior of Biomedical Materials, 2015, 42, 198-206.	1.5	82
132	Molecular asphaltene models based on Clar sextet theory. RSC Advances, 2015, 5, 753-759.	1.7	82
133	Effect of Wrinkles on the Surface Area of Graphene: Toward the Design of Nanoelectronics. Nano Letters, 2014, 14, 6520-6525.	4.5	81
134	The minimal nanowire: Mechanical properties of carbyne. Europhysics Letters, 2011, 95, 16002.	0.7	79
135	Geometry and temperature effects of the interfacial thermal conductance in copperâ€“ and nickelâ€“graphene nanocomposites. Journal of Physics Condensed Matter, 2012, 24, 245301.	0.7	79
136	Asymptotic Strength Limit of Hydrogen-Bond Assemblies in Proteins at Vanishing Pulling Rates. Physical Review Letters, 2008, 100, 198301.	2.9	77
137	Protein-free formation of bone-like apatite: New insights into the key role of carbonation. Biomaterials, 2017, 127, 75-88.	5.7	77
138	A review of combined experimental and computational procedures for assessing biopolymer structureâ€“processâ€“property relationships. Biomaterials, 2012, 33, 8240-8255.	5.7	76
139	Comparison of Synthetic Dopamineâ€“Eumelanin Formed in the Presence of Oxygen and Cu²⁺ Cations as Oxidants. Langmuir, 2013, 29, 12754-12761.	1.6	75
140	Defect-Tolerant Bioinspired Hierarchical Composites: Simulation and Experiment. ACS Biomaterials Science and Engineering, 2015, 1, 295-304.	2.6	75
141	Modelling the mechanics of partially mineralized collagen fibrils, fibres and tissue. Journal of the Royal Society Interface, 2014, 11, 20130835.	1.5	74
142	A single degree of freedom â€˜lollipopâ€™ model for carbon nanotube bundle formation. Journal of the Mechanics and Physics of Solids, 2010, 58, 409-427.	2.3	71
143	Impact tolerance in mussel thread networks by heterogeneous material distribution. Nature Communications, 2013, 4, 2187.	5.8	71
144	Sequence-structure correlations in silk: Poly-Ala repeat of N. clavipes MaSp1 is naturally optimized at a critical length scale. Journal of the Mechanical Behavior of Biomedical Materials, 2012, 7, 30-40.	1.5	69

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145	Optimization of Composite Fracture Properties: Method, Validation, and Applications. Journal of Applied Mechanics, Transactions ASME, 2016, 83, .	1.1	69
146	End-to-end deep learning method to predict complete strain and stress tensors for complex hierarchical composite microstructures. Journal of the Mechanics and Physics of Solids, 2021, 154, 104506.	2.3	68
147	Alpha-Helical Protein Networks Are Self-Protective and Flaw-Tolerant. PLoS ONE, 2009, 4, e6015.	1.1	68
148	Hydration and distance dependence of intermolecular shearing between collagen molecules in a model microfibril. Journal of Biomechanics, 2012, 45, 2079-2083.	0.9	67
149	Cracking and adhesion at small scales: atomistic and continuum studies of flaw tolerant nanostructures. Modelling and Simulation in Materials Science and Engineering, 2006, 14, 799-816.	0.8	65
150	Superelasticity, energy dissipation and strain hardening of vimentin coiled-coil intermediate filaments: atomistic and continuum studies. Journal of Materials Science, 2007, 42, 8771-8787.	1.7	64
151	Role of Intrafibrillar Collagen Mineralization in Defining the Compressive Properties of Nascent Bone. Biomacromolecules, 2014, 15, 2494-2500.	2.6	64
152	Failure of AÎ²(1-40) amyloid fibrils under tensile loading. Biomaterials, 2011, 32, 3367-3374.	5.7	62
153	Characterization of the intrinsic strength between epoxy and silica using a multiscale approach. Journal of Materials Research, 2012, 27, 1787-1796.	1.2	62
154	Influence of geometry on mechanical properties of bio-inspired silica-based hierarchical materials. Bioinspiration and Biomimetics, 2012, 7, 036024.	1.5	62
155	Mesoscale mechanics of wood cell walls under axial strain. Soft Matter, 2013, 9, 7138.	1.2	62
156	Thermal transport in monolayer graphene oxide: Atomistic insights into phonon engineering through surface chemistry. Carbon, 2014, 77, 351-359.	5.4	62
157	Single molecule effects of osteogenesis imperfecta mutations in tropocollagen protein domains. Protein Science, 2009, 18, 161-168.	3.1	61
158	Molecular mechanism of force induced stabilization of collagen against enzymatic breakdown. Biomaterials, 2012, 33, 3852-3859.	5.7	61
159	Sequenceâ€"Structureâ€"Property Relationships of Recombinant Spider Silk Proteins: Integration of Biopolymer Design, Processing, and Modeling. Advanced Functional Materials, 2013, 23, 241-253.	7.8	61
160	Self-folding of single- and multiwall carbon nanotubes. Applied Physics Letters, 2007, 90, 073107.	1.5	60
161	Secondary Structure Transition and Critical Stress for a Model of Spider Silk Assembly. Biomacromolecules, 2016, 17, 427-436.	2.6	60
162	Accumulation of collagen molecular unfolding is the mechanism of cyclic fatigue damage and failure in collagenous tissues. Science Advances, 2020, 6, eaba2795.	4.7	60

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163	A Materiomics Approach to Spider Silk: Protein Molecules to Webs. Jom, 2012, 64, 214-225.	0.9	58
164	Coupled continuum and discrete analysis of random heterogeneous materials: Elasticity and fracture. Journal of the Mechanics and Physics of Solids, 2014, 63, 481-490.	2.3	58
165	Large Deformation Mechanisms, Plasticity, and Failure of an Individual Collagen Fibril With Different Mineral Content. Journal of Bone and Mineral Research, 2016, 31, 380-390.	3.1	58
166	Multiscale Mechanics of Triply Periodic Minimal Surfaces of Three-Dimensional Graphene Foams. Nano Letters, 2018, 18, 4845-4853.	4.5	57
167	Artificial intelligence design algorithm for nanocomposites optimized for shear crack resistance. Nano Futures, 2019, 3, 035001.	1.0	57
168	Molecular mechanics of mussel adhesion proteins. Journal of the Mechanics and Physics of Solids, 2014, 62, 19-30.	2.3	56
169	Atomic plasticity: description and analysis of a one-billion atom simulation of ductile materials failure. Computer Methods in Applied Mechanics and Engineering, 2004, 193, 5257-5282.	3.4	55
170	Tuning heterogeneous poly(dopamine) structures and mechanics: in silico covalent cross-linking and thin film nanoindentation. Soft Matter, 2014, 10, 457-464.	1.2	55
171	A multi-scale approach to understand the mechanobiology of intermediate filaments. Journal of Biomechanics, 2010, 43, 15-22.	0.9	53
172	Tunable nanomechanics of protein disulfide bonds in redox microenvironments. Journal of the Mechanical Behavior of Biomedical Materials, 2012, 5, 32-40.	1.5	52
173	Intercalated water layers promote thermal dissipation at bioâ€"nano interfaces. Nature Communications, 2016, 7, 12854.	5.8	52
174	Conductive Silkâ€Based Composites Using Biobased Carbon Materials. Advanced Materials, 2019, 31, e1904720.	11.1	52
175	Nanomechanical properties of vimentin intermediate filament dimers. Nanotechnology, 2009, 20, 425101.	1.3	51
176	Bioinspired nanoporous silicon provides great toughness at great deformability. Computational Materials Science, 2010, 48, 303-309.	1.4	51
177	Structure and Mechanical Properties of Human Trichocyte Keratin Intermediate Filament Protein. Biomacromolecules, 2012, 13, 3522-3532.	2.6	51
178	Structureâ€"mechanics relationships of collagen fibrils in the osteogenesis imperfecta mouse model. Journal of the Royal Society Interface, 2015, 12, 20150701.	1.5	51
179	Mesoscale mechanics of twisting carbon nanotube yarns. Nanoscale, 2015, 7, 5435-5445.	2.8	51
180	Biomateriomics. Springer Series in Materials Science, 2012, , .	0.4	51

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181	Atomistic Study of Crack-Tip Cleavage to Dislocation Emission Transition in Silicon Single Crystals. Physical Review Letters, 2010, 104, 235502.	2.9	49
182	Set in stone? A perspective on the concrete sustainability challenge. MRS Bulletin, 2012, 37, 395-402.	1.7	49
183	Molecular mechanics of silk nanostructures under varied mechanical loading. Biopolymers, 2012, 97, 408-417.	1.2	49
184	Nanoindentation study of size effects in nickelâ€“graphene nanocomposites. Philosophical Magazine Letters, 2013, 93, 196-203.	0.5	49
185	Computational smart polymer design based on elastin protein mutability. Biomaterials, 2017, 127, 49-60.	5.7	49
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