Markus J Buehler

List of Publications by Year
in descending order

580 papers	38,118 citations	1695 104 h-index	4366 173 g-index
604 all docs	604 docs citations	604 times ranked	35024 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.	26.6	1,169
2	A realistic molecular model of cement hydrates. Proceedings of the National Academy of Sciences of the United States of America, 2009, 106, 16102-16107.	7.6	775
3	Multifunctionality and control of the crumpling and unfolding of large-area graphene. Nature Materials, 2013, 12, 321-325.	26.6	750
4	Nanomechanics of functional and pathological amyloid materials. Nature Nanotechnology, 2011, 6, 469-479.	30.5	715
5	Merger of structure and material in nacre and bone â€“ Perspectives on de novo biomimetic materials. Progress in Materials Science, 2009, 54, 1059-1100.	33.8	685
6	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.	7.6	663
7	On the Mechanistic Origins of Toughness in Bone. Annual Review of Materials Research, 2010, 40, 25-53.	9.8	591
8	Hierarchical Structure and Nanomechanics of Collagen Microfibrils from the Atomistic Scale Up. Nano Letters, 2011, 11, 757-766.	9.5	577
9	Structure and mechanics of interfaces in biological materials. Nature Reviews Materials, 2016, 1, .	40.2	532
10	Polydopamine and Eumelanin: From Structureâ€“Property Relationships to a Unified Tailoring Strategy. Accounts of Chemical Research, 2014, 47, 3541-3550.	16.6	530
11	Nanofibrils in nature and materials engineering. Nature Reviews Materials, 2018, 3, .	40.2	501
12	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.	15.3	418
13	Nonlinear material behaviour of spider silk yields robust webs. Nature, 2012, 482, 72-76.	36.2	405
14	Mechanical properties of graphyne. Carbon, 2011, 49, 4111-4121.	10.7	404
15	Molecular mechanics of mineralized collagen fibrils in bone. Nature Communications, 2013, 4, 1724.	13.2	402
16	Bioinspired hierarchical composite design using machine learning: simulation, additive manufacturing, and experiment. Materials Horizons, 2018, 5, 939-945.	12.8	379
17	Molecular and Nanostructural Mechanisms of Deformation, Strength and Toughness of Spider Silk Fibrils. Nano Letters, 2010, 10, 2626-2634.	9.5	368
18	The mechanics and design of a lightweight three-dimensional graphene assembly. Science Advances, 2017, 3, e1601536.	10.9	347

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19	Biopolymer nanofibrils: Structure, modeling, preparation, and applications. Progress in Polymer Science, 2018, 85, 1-56.	26.2	332
20	De novo composite design based on machine learning algorithm. Extreme Mechanics Letters, 2018, 18, 19-28.	4.2	329
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.	3.1	325
22	Tough Composites Inspired by Mineralized Natural Materials: Computation, 3D printing, and Testing. Advanced Functional Materials, 2013, 23, 4629-4638.	16.5	323
23	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.	3.1	314
24	Deformation and failure of protein materials in physiologically extreme conditions and disease. Nature Materials, 2009, 8, 175-188.	26.6	308
25	Hyperelasticity governs dynamic fracture at a critical length scale. Nature, 2003, 426, 141-146.	36.2	298
26	Artificial intelligence and machine learning in design of mechanical materials. Materials Horizons, 2021, 8, 1153-1172.	12.8	289
27	Plasticity and toughness in bone. Physics Today, 2009, 62, 41-47.	0.4	288
28	Hierarchically Enhanced Impact Resistance of Bioinspired Composites. Advanced Materials, 2017, 29, 1700060.	24.3	281
29	Atomistic and continuum modeling of mechanical properties of collagen: Elasticity, fracture, and self-assembly. Journal of Materials Research, 2006, 21, 1947-1961.	2.6	261
30	Dynamical fracture instabilities due to local hyperelasticity at crack tips. Nature, 2006, 439, 307-310.	36.2	255
31	Molecular nanomechanics of nascent bone: fibrillar toughening by mineralization. Nanotechnology, 2007, 18, 295102.	2.7	248
32	Nanostructure and molecular mechanics of spider dragline silk protein assemblies. Journal of the Royal Society Interface, 2010, 7, 1709-1721.	3.4	237
33	Design and function of biomimetic multilayer water purification membranes. Science Advances, 2017, 3, e1601939.	10.9	237
34	Geometry Controls Conformation of Graphene Sheets: Membranes, Ribbons, and Scrolls. ACS Nano, 2010, 4, 3869-3876.	15.3	231
35	Nanoconfinement of Spider Silk Fibrils Begets Superior Strength, Extensibility, and Toughness. Nano Letters, 2011, 11, 5038-5046.	9.5	228
36	Polymorphic regenerated silk fibers assembled through bioinspired spinning. Nature Communications, 2017, 8, 1387.	13.2	222

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37	Geometric Confinement Governs the Rupture Strength of H-bond Assemblies at a Critical Length Scale. Nano Letters, 2008, 8, 743-748.	9.5	215
38	Multiparadigm Modeling of Dynamical Crack Propagation in Silicon Using a Reactive Force Field. Physical Review Letters, 2006, 96, 095505.	8.0	214
39	Fracture mechanics of protein materials. Materials Today, 2007, 10, 46-58.	18.1	212
40	Nanoengineering Heat Transfer Performance at Carbon Nanotube Interfaces. ACS Nano, 2009, 3, 2767-2775.	15.3	212
41	Interface structure and mechanics between graphene and metal substrates: a first-principles study. Journal of Physics Condensed Matter, 2010, 22, 485301.	1.9	212
42	Structureâ€“functionâ€“propertyâ€“design interplay in biopolymers: Spider silk. Acta Biomaterialia, 2014, 10, 1612-1626.	8.8	212
43	Paraffin-enabled graphene transfer. Nature Communications, 2019, 10, 867.	13.2	209
44	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.	7.6	199
45	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.	3.8	199
46	Hydration of Calcium Oxide Surface Predicted by Reactive Force Field Molecular Dynamics. Langmuir, 2012, 28, 4187-4197.	3.7	199
47	Selective hydrogen purification through graphdiyne under ambient temperature and pressure. Nanoscale, 2012, 4, 4587.	5.8	198
48	Entropic Elasticity Controls Nanomechanics of Single Tropocollagen Molecules. Biophysical Journal, 2007, 93, 37-43.	0.5	192
49	Molecular level detection and localization of mechanical damage in collagen enabled by collagen hybridizing peptides. Nature Communications, 2017, 8, 14913.	13.2	192
50	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	188
51	Transition-metal coordinate bonds for bioinspired macromolecules with tunable mechanical properties. Nature Reviews Materials, 2021, 6, 421-436.	40.2	187
52	Mesoscale modeling of mechanics of carbon nanotubes: Self-assembly, self-folding, and fracture. Journal of Materials Research, 2006, 21, 2855-2869.	2.6	186
53	Meso-origami: Folding multilayer graphene sheets. Applied Physics Letters, 2009, 95, .	3.2	185
54	Hierarchically structured bioinspired nanocomposites. Nature Materials, 2023, 22, 18-35.	26.6	179

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55	Extended graphynes: simple scaling laws for stiffness, strength and fracture. Nanoscale, 2012, 4, 7797.	5.8	175
56	Osmotic pressure induced tensile forces in tendon collagen. Nature Communications, 2015, 6, 5942.	13.2	174
57	Protective role of Arapaima gigas fish scales: Structure and mechanical behavior. Acta Biomaterialia, 2014, 10, 3599-3614.	8.8	173
58	Hierarchical Structure Controls Nanomechanical Properties of Vimentin Intermediate Filaments. PLoS ONE, 2009, 4, e7294.	2.5	169
59	Polydopamine and eumelanin molecular structures investigated with ab initio calculations. Chemical Science, 2017, 8, 1631-1641.	7.8	167
60	Structural hierarchies define toughness and defect-tolerance despite simple and mechanically inferior brittle building blocks. Scientific Reports, 2011, 1, 35.	3.4	165
61	Tearing Graphene Sheets From Adhesive Substrates Produces Tapered Nanoribbons. Small, 2010, 6, 1108-1116.	11.2	164
62	Mechanical exfoliation of two-dimensional materials. Journal of the Mechanics and Physics of Solids, 2018, 115, 248-262.	4.9	161
63	Deep learning model to predict complex stress and strain fields in hierarchical composites. Science Advances, 2021, 7, .	10.9	160
64	The hidden structure of human enamel. Nature Communications, 2019, 10, 4383.	13.2	157
65	Deformation rate controls elasticity and unfolding pathway of single tropocollagen molecules. Journal of the Mechanical Behavior of Biomedical Materials, 2009, 2, 130-137.	3.1	156
66	Ultrathin thermoresponsive self-folding 3D graphene. Science Advances, 2017, 3, e1701084.	10.9	153
67	Ultrathin Free-Standing <i>Bombyx mori</i> Silk Nanofibril Membranes. Nano Letters, 2016, 16, 3795-3800.	9.5	152
68	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.	15.3	151
69	Integration of Stiff Graphene and Tough Silk for the Design and Fabrication of Versatile Electronic Materials. Advanced Functional Materials, 2018, 28, 1705291.	16.5	149
70	Structural solution using molecular dynamics: Fundamentals and a case study of epoxy-silica interface. International Journal of Solids and Structures, 2011, 48, 2131-2140.	2.7	148
71	Viscoelastic properties of model segments of collagen molecules. Matrix Biology, 2012, 31, 141-149.	3.7	148
72	Boneâ€Inspired Materials by Design: Toughness Amplification Observed Using 3D Printing and Testing. Advanced Engineering Materials, 2016, 18, 1354-1363.	3.5	148

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73	Highâ€Strength, Durable Allâ€Silk Fibroin Hydrogels with Versatile Processability toward Multifunctional Applications. Advanced Functional Materials, 2018, 28, 1704757.	16.5	144
74	Structural optimization of 3D-printed synthetic spider webs for high strength. Nature Communications, 2015, 6, 7038.	13.2	143
75	Deposition Mechanism and Properties of Thin Polydopamine Films for High Added Value Applications in Surface Science at the Nanoscale. BioNanoScience, 2012, 2, 16-34.	3.3	142
76	Liquid Exfoliated Natural Silk Nanofibrils: Applications in Optical and Electrical Devices. Advanced Materials, 2016, 28, 7783-7790.	24.3	139
77	Atomically Sharp Crack Tips in Monolayer MoS₂ and Their Enhanced Toughness by Vacancy Defects. ACS Nano, 2016, 10, 9831-9839.	15.3	138
78	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.	8.0	137
79	Materiomics: An â€<i>omics</i> Approach to Biomaterials Research. Advanced Materials, 2013, 25, 802-824.	24.3	137
80	Excitonic effects from geometric order and disorder explain broadband optical absorption in eumelanin. Nature Communications, 2014, 5, 3859.	13.2	137
81	Biomimetic additive manufactured polymer composites for improved impact resistance. Extreme Mechanics Letters, 2016, 9, 317-323.	4.2	137
82	Mechanics and molecular filtration performance of graphyne nanoweb membranes for selective water purification. Nanoscale, 2013, 5, 11801.	5.8	135
83	Biological Material Interfaces as Inspiration for Mechanical and Optical Material Designs. Chemical Reviews, 2019, 119, 12279-12336.	51.4	134
84	Melanin Biopolymers: Tailoring Chemical Complexity for Materials Design. Angewandte Chemie - International Edition, 2020, 59, 11196-11205.	14.8	133
85	Strain controlled thermomutability of single-walled carbon nanotubes. Nanotechnology, 2009, 20, 185701.	2.7	131
86	The Rise of Hierarchical Nanostructured Materials from Renewable Sources: Learning from Nature. ACS Nano, 2018, 12, 7425-7433.	15.3	131
87	Printing nature: Unraveling the role of nacre's mineral bridges. Journal of the Mechanical Behavior of Biomedical Materials, 2017, 76, 135-144.	3.1	127
88	Molecular and Mesoscale Mechanisms of Osteogenesis Imperfecta Disease in Collagen Fibrils. Biophysical Journal, 2009, 97, 857-865.	0.5	125
89	Threshold Crack Speed Controls Dynamical Fracture of Silicon Single Crystals. Physical Review Letters, 2007, 99, 165502.	8.0	124
90	Alzheimer's AÎ²(1-40) Amyloid Fibrils Feature Size-Dependent Mechanical Properties. Biophysical Journal, 2010, 98, 2053-2062.	0.5	124

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91	Molecular mechanics of polycrystalline graphene with enhanced fracture toughness. Extreme Mechanics Letters, 2015, 2, 52-59.	4.2	124
92	Predictive modelling-based design and experiments for synthesis and spinning of bioinspired silk fibres. Nature Communications, 2015, 6, 6892.	13.2	121
93	Additive Manufacturing Approaches for Hydroxyapatiteâ€Reinforced Composites. Advanced Functional Materials, 2019, 29, 1903055.	16.5	121
94	Dynamic pigmentary and structural coloration within cephalopod chromatophore organs. Nature Communications, 2019, 10, 1004.	13.2	120
95	Tu(r)ning weakness to strength. Nano Today, 2010, 5, 379-383.	12.3	119
96	Deformation micromechanisms of collagen fibrils under uniaxial tension. Journal of the Royal Society Interface, 2010, 7, 839-850.	3.4	117
97	Spider dragline silk as torsional actuator driven by humidity. Science Advances, 2019, 5, eaau9183.	10.9	117
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.	3.7	116
99	Structural and Mechanical Differences between Collagen Homo- and Heterotrimers: Relevance for the Molecular Origin of Brittle Bone Disease. Biophysical Journal, 2012, 102, 640-648.	0.5	115
100	Modeling and additive manufacturing of bio-inspired composites with tunable fracture mechanical properties. Soft Matter, 2014, 10, 4436.	2.8	114
101	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.	1.5	113
102	Packing efficiency and accessible surface area of crumpled graphene. Physical Review B, 2011, 84, .	3.3	111
103	Advanced Structural Materials by Bioinspiration. Advanced Engineering Materials, 2017, 19, 1600787.	3.5	110
104	Bio-Inspired Carbon Nanotubeâ€"Polymer Composite Yarns with Hydrogen Bond-Mediated Lateral Interactions. ACS Nano, 2013, 7, 3434-3446.	15.3	108
105	Using Deep Learning to Predict Fracture Patterns in Crystalline Solids. Matter, 2020, 3, 197-211.	10.2	107
106	Thickness of Hydroxyapatite Nanocrystal Controls Mechanical Properties of the Collagenâ€"Hydroxyapatite Interface. Langmuir, 2012, 28, 1982-1992.	3.7	106
107	Design and Fabrication of Silk Templated Electronic Yarns and Applications in Multifunctional Textiles. Matter, 2019, 1, 1411-1425.	10.2	105
108	Electrospinning Piezoelectric Fibers for Biocompatible Devices. Advanced Healthcare Materials, 2020, 9, e1901287.	8.5	105

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109	Twisted and coiled ultralong multilayer graphene ribbons. Modelling and Simulation in Materials Science and Engineering, 2011, 19, 054003.	1.9	103
110	Printing of stretchable silk membranes for strain measurements. Lab on A Chip, 2016, 16, 2459-2466.	6.1	102
111	Molecular biomechanics of collagen molecules. Materials Today, 2014, 17, 70-76.	18.1	97
112	Sub-nanometre channels embedded in two-dimensional materials. Nature Materials, 2018, 17, 129-133.	26.6	97
113	The effect of non-covalent functionalization on the thermal conductance of graphene/organic interfaces. Nanotechnology, 2013, 24, 165702.	2.7	96
114	Coarse-Grained Model of Collagen Molecules Using an Extended MARTINI Force Field. Journal of Chemical Theory and Computation, 2010, 6, 1210-1218.	5.6	95
115	<i>In silico</i>assembly and nanomechanical characterization of carbon nanotube buckypaper. Nanotechnology, 2010, 21, 265706.	2.7	94
116	Three-Dimensional-Printing of Bio-Inspired Composites. Journal of Biomechanical Engineering, 2016, 138, 021006.	1.4	93
117	Mechanism of friction in rotating carbon nanotube bearings. Journal of the Mechanics and Physics of Solids, 2013, 61, 652-673.	4.9	92
118	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.	15.3	92
119	A Constitutive Model of Soft Tissue: From Nanoscale Collagen to Tissue Continuum. Annals of Biomedical Engineering, 2009, 37, 1117-1130.	2.6	90
120	Molecular asphaltene models based on Clar sextet theory. RSC Advances, 2015, 5, 753-759.	3.7	90
121	Tensan Silk-Inspired Hierarchical Fibers for Smart Textile Applications. ACS Nano, 2018, 12, 6968-6977.	15.3	90
122	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.	7.6	89
123	Remarkably Distinct Mechanical Flexibility in Three Structurally Similar Semiconducting Organic Crystals Studied by Nanoindentation and Molecular Dynamics. Chemistry of Materials, 2019, 31, 1391-1402.	7.1	89
124	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.	2.1	88
125	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.	3.1	87
126	Atomistic model of the spider silk nanostructure. Applied Physics Letters, 2010, 96, .	3.2	86

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127	Silkâ€"Its Mysteries, How It Is Made, and How It Is Used. ACS Biomaterials Science and Engineering, 2015, 1, 864-876.	5.4	86
128	Molecular deformation mechanisms of the wood cell wall material. Journal of the Mechanical Behavior of Biomedical Materials, 2015, 42, 198-206.	3.1	86
129	Design of Multistimuli Responsive Hydrogels Using Integrated Modeling and Genetically Engineered Silkâ€"Elastinâ€Like Proteins. Advanced Functional Materials, 2016, 26, 4113-4123.	16.5	86
130	Mechanomutable properties of a PAA/PAH polyelectrolyte complex: rate dependence and ionization effects on tunable adhesion strength. Soft Matter, 2010, 6, 4175.	2.8	84
131	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.	4.9	84
132	Effect of Wrinkles on the Surface Area of Graphene: Toward the Design of Nanoelectronics. Nano Letters, 2014, 14, 6520-6525.	9.5	83
133	Geometry and temperature effects of the interfacial thermal conductance in copperâ€" and nickelâ€"graphene nanocomposites. Journal of Physics Condensed Matter, 2012, 24, 245301.	1.9	82
134	Defect-Tolerant Bioinspired Hierarchical Composites: Simulation and Experiment. ACS Biomaterials Science and Engineering, 2015, 1, 295-304.	5.4	82
135	Protein-free formation of bone-like apatite: New insights into the key role of carbonation. Biomaterials, 2017, 127, 75-88.	11.8	81
136	Impact tolerance in mussel thread networks by heterogeneous material distribution. Nature Communications, 2013, 4, 2187.	13.2	80
137	A review of combined experimental and computational procedures for assessing biopolymer structureâ€"processâ€"property relationships. Biomaterials, 2012, 33, 8240-8255.	11.8	79
138	Modelling the mechanics of partially mineralized collagen fibrils, fibres and tissue. Journal of the Royal Society Interface, 2014, 11, 20130835.	3.4	78
139	Asymptotic Strength Limit of Hydrogen-Bond Assemblies in Proteins at Vanishing Pulling Rates. Physical Review Letters, 2008, 100, 198301.	8.0	77
140	Comparison of Synthetic Dopamineâ€"Eumelanin Formed in the Presence of Oxygen and Cu²⁺ Cations as Oxidants. Langmuir, 2013, 29, 12754-12761.	3.7	77
141	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.	4.9	74
142	Optimization of Composite Fracture Properties: Method, Validation, and Applications. Journal of Applied Mechanics, Transactions ASME, 2016, 83, .	2.3	73
143	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.	3.1	72
144	Hydration and distance dependence of intermolecular shearing between collagen molecules in a model microfibril. Journal of Biomechanics, 2012, 45, 2079-2083.	2.1	71

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145	Alpha-Helical Protein Networks Are Self-Protective and Flaw-Tolerant. PLoS ONE, 2009, 4, e6015.	2.5	68
146	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.	1.9	67
147	Superelasticity, energy dissipation and strain hardening of vimentin coiled-coil intermediate filaments: atomistic and continuum studies. Journal of Materials Science, 2007, 42, 8771-8787.	3.7	67
148	Accumulation of collagen molecular unfolding is the mechanism of cyclic fatigue damage and failure in collagenous tissues. Science Advances, 2020, 6, eaba2795.	10.9	67
149	Characterization of the intrinsic strength between epoxy and silica using a multiscale approach. Journal of Materials Research, 2012, 27, 1787-1796.	2.6	66
150	Mesoscale mechanics of wood cell walls under axial strain. Soft Matter, 2013, 9, 7138.	2.8	66
151	Role of Intrafibrillar Collagen Mineralization in Defining the Compressive Properties of Nascent Bone. Biomacromolecules, 2014, 15, 2494-2500.	5.6	66
152	Single molecule effects of osteogenesis imperfecta mutations in tropocollagen protein domains. Protein Science, 2009, 18, 161-168.	7.8	65
153	Influence of geometry on mechanical properties of bio-inspired silica-based hierarchical materials. Bioinspiration and Biomimetics, 2012, 7, 036024.	2.9	64
154	Thermal transport in monolayer graphene oxide: Atomistic insights into phonon engineering through surface chemistry. Carbon, 2014, 77, 351-359.	10.7	64
155	Artificial intelligence design algorithm for nanocomposites optimized for shear crack resistance. Nano Futures, 2019, 3, 035001.	2.2	64
156	Secondary Structure Transition and Critical Stress for a Model of Spider Silk Assembly. Biomacromolecules, 2016, 17, 427-436.	5.6	63
157	Failure of Aβ(1-40) amyloid fibrils under tensile loading. Biomaterials, 2011, 32, 3367-3374.	11.8	62
158	Molecular mechanism of force induced stabilization of collagen against enzymatic breakdown. Biomaterials, 2012, 33, 3852-3859.	11.8	62
159	Sequenceâ€"Structureâ€"Property Relationships of Recombinant Spider Silk Proteins: Integration of Biopolymer Design, Processing, and Modeling. Advanced Functional Materials, 2013, 23, 241-253.	16.5	62
160	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.	3.0	61
161	Multiscale Mechanics of Triply Periodic Minimal Surfaces of Three-Dimensional Graphene Foams. Nano Letters, 2018, 18, 4845-4853.	9.5	61
162	Coupled continuum and discrete analysis of random heterogeneous materials: Elasticity and fracture. Journal of the Mechanics and Physics of Solids, 2014, 63, 481-490.	4.9	60

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163	A Materiomics Approach to Spider Silk: Protein Molecules to Webs. Jom, 2012, 64, 214-225.	2.2	58
164	Molecular mechanics of mussel adhesion proteins. Journal of the Mechanics and Physics of Solids, 2014, 62, 19-30.	4.9	57
165	Conductive Silkâ€Based Composites Using Biobased Carbon Materials. Advanced Materials, 2019, 31, e1904720.	24.3	57
166	Tuning heterogeneous poly(dopamine) structures and mechanics: in silico covalent cross-linking and thin film nanoindentation. Soft Matter, 2014, 10, 457-464.	2.8	56
167	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.	6.7	55
168	Mesoscale mechanics of twisting carbon nanotube yarns. Nanoscale, 2015, 7, 5435-5445.	5.8	55
169	Structure and Mechanical Properties of Human Trichocyte Keratin Intermediate Filament Protein. Biomacromolecules, 2012, 13, 3522-3532.	5.6	54
170	Intercalated water layers promote thermal dissipation at bioâ€"nano interfaces. Nature Communications, 2016, 7, 12854.	13.2	54
171	Nanomechanical properties of vimentin intermediate filament dimers. Nanotechnology, 2009, 20, 425101.	2.7	53
172	A multi-scale approach to understand the mechanobiology of intermediate filaments. Journal of Biomechanics, 2010, 43, 15-22.	2.1	53
173	A robust nanoscale experimental quantification of fracture energy in a bilayer material system. Proceedings of the National Academy of Sciences of the United States of America, 2014, 111, 11990-11995.	7.6	53
174	Bioinspired nanoporous silicon provides great toughness at great deformability. Computational Materials Science, 2010, 48, 303-309.	3.1	52
175	Tunable nanomechanics of protein disulfide bonds in redox microenvironments. Journal of the Mechanical Behavior of Biomedical Materials, 2012, 5, 32-40.	3.1	52
176	Computational smart polymer design based on elastin protein mutability. Biomaterials, 2017, 127, 49-60.	11.8	52
177	Synergistic Rollâ€toâ€Roll Transfer and Doping of CVDâ€Graphene Using Parylene for Ambientâ€Stable and Ultraâ€Lightweight Photovoltaics. Advanced Functional Materials, 2020, 30, 2001924.	16.5	52
178	Self-Folding Hybrid Graphene Skin for 3D Biosensing. Nano Letters, 2019, 19, 1409-1417.	9.5	51
179	Set in stone? A perspective on the concrete sustainability challenge. MRS Bulletin, 2012, 37, 395-402.	4.2	50
180	Atomistic Investigation of Load Transfer Between DWNT Bundles â€œCrosslinkedâ€• by PMMA Oligomers. Advanced Functional Materials, 2013, 23, 1883-1892.	16.5	50

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181	Synergistic Integration of Experimental and Simulation Approaches for the <i>de Novo</i> Design of Silk-Based Materials. Accounts of Chemical Research, 2017, 50, 866-876.	16.6	50
182	Atomistic Study of Crack-Tip Cleavage to Dislocation Emission Transition in Silicon Single Crystals. Physical Review Letters, 2010, 104, 235502.	8.0	49
183	Heat dissipation at a grapheneâ€“substrate interface. Journal of Physics Condensed Matter, 2012, 24, 475305.	1.9	49
184	Molecular mechanics of silk nanostructures under varied mechanical loading. Biopolymers, 2012, 97, 408-417.	2.6	49
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