Markus J Buehler

List of Publications by Citations

501 papers	28,455 citations	88 h-index	150 g-index
564 ext. papers	32,889 ext. citations	8.1 avg, IF	7.94 L-index

#	Paper	IF	Citations
501	Nanoconfinement controls stiffness, strength and mechanical toughness of beta-sheet crystals in silk. *Nature Materials*, **2010**, 9, 359-67	27	916
500	Current issues in research on structure–property relationships in polymer nanocomposites. *Polymer*, **2010**, 51, 3321-3343	3.9	673
499	Multifunctionality and control of the crumpling and unfolding of large-area graphene. *Nature Materials*, **2013**, 12, 321-5	27	641
498	Nanomechanics of functional and pathological amyloid materials. *Nature Nanotechnology*, **2011**, 6, 469-79	38.7	590
497	A realistic molecular model of cement hydrates. *Proceedings of the National Academy of Sciences of the United States of America*, **2009**, 106, 16102-7	11.5	547
496	Merger of structure and material in nacre and bone – Perspectives on de novo biomimetic materials. *Progress in Materials Science*, **2009**, 54, 1059-1100	42.2	546
495	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, 12285-90	11.5	538
494	On the Mechanistic Origins of Toughness in Bone. *Annual Review of Materials Research*, **2010**, 40, 25-53	12.8	451
493	Hierarchical structure and nanomechanics of collagen microfibrils from the atomistic scale up. *Nano Letters*, **2011**, 11, 757-66	11.5	442
492	Polydopamine and eumelanin: from structure-property relationships to a unified tailoring strategy. *Accounts of Chemical Research*, **2014**, 47, 3541-50	24.3	402
491	Tuning the mechanical properties of graphene oxide paper and its associated polymer nanocomposites by controlling cooperative intersheet hydrogen bonding. *ACS Nano*, **2012**, 6, 2008-19	16.7	361
490	Nonlinear material behaviour of spider silk yields robust webs. *Nature*, **2012**, 482, 72-6	50.4	322
489	Structure and mechanics of interfaces in biological materials. *Nature Reviews Materials*, **2016**, 1,	73.3	319
488	Mechanical properties of graphyne. *Carbon*, **2011**, 49, 4111-4121	10.4	314
487	Nanofibrils in nature and materials engineering. *Nature Reviews Materials*, **2018**, 3,	73.3	304
486	Molecular mechanics of mineralized collagen fibrils in bone. *Nature Communications*, **2013**, 4, 1724	17.4	302
485	Molecular and nanostructural mechanisms of deformation, strength and toughness of spider silk fibrils. *Nano Letters*, **2010**, 10, 2626-34	11.5	301

484	Deformation and failure of protein materials in physiologically extreme conditions and disease. *Nature Materials*, **2009**, 8, 175-88	27	270
483	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	4.1	269
482	Combinatorial molecular optimization of cement hydrates. *Nature Communications*, **2014**, 5, 4960	17.4	260
481	Hyperelasticity governs dynamic fracture at a critical length scale. *Nature*, **2003**, 426, 141-6	50.4	256
480	Tough Composites Inspired by Mineralized Natural Materials: Computation, 3D printing, and Testing. *Advanced Functional Materials*, **2013**, 23, 4629-4638	15.6	252
479	The mechanics and design of a lightweight three-dimensional graphene assembly. *Science Advances* , **2017**, 3, e1601536	14.3	250
478	Plasticity and toughness in bone. *Physics Today*, **2009**, 62, 41-47	0.9	238
477	Atomistic and continuum modeling of mechanical properties of collagen: Elasticity, fracture, and self-assembly. *Journal of Materials Research*, **2006**, 21, 1947-1961	2.5	217
476	Molecular nanomechanics of nascent bone: fibrillar toughening by mineralization. *Nanotechnology*, **2007**, 18, 295102	3.4	216
475	Dynamical fracture instabilities due to local hyperelasticity at crack tips. *Nature*, **2006**, 439, 307-10	50.4	216
474	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	4.1	205
473	Geometry controls conformation of graphene sheets: membranes, ribbons, and scrolls. *ACS Nano*, **2010**, 4, 3869-76	16.7	203
472	Nanoconfinement of spider silk fibrils begets superior strength, extensibility, and toughness. *Nano Letters*, **2011**, 11, 5038-46	11.5	195
471	Multiparadigm modeling of dynamical crack propagation in silicon using a reactive force field. *Physical Review Letters*, **2006**, 96, 095505	7.4	194
470	Fracture mechanics of protein materials. *Materials Today*, **2007**, 10, 46-58	21.8	189
469	Bioinspired hierarchical composite design using machine learning: simulation, additive manufacturing, and experiment. *Materials Horizons*, **2018**, 5, 939-945	14.4	186
468	Geometric confinement governs the rupture strength of H-bond assemblies at a critical length scale. *Nano Letters*, **2008**, 8, 743-8	11.5	183
467	Biopolymer nanofibrils: structure, modeling, preparation, and applications. *Progress in Polymer Science*, **2018**, 85, 1-56	29.6	183

466	Nanoengineering heat transfer performance at carbon nanotube interfaces. *ACS Nano*, **2009**, 3, 2767-75	16.7	181
465	Nanostructure and molecular mechanics of spider dragline silk protein assemblies. *Journal of the Royal Society Interface*, **2010**, 7, 1709-21	4.1	178
464	Interface structure and mechanics between graphene and metal substrates: a first-principles study. *Journal of Physics Condensed Matter*, **2010**, 22, 485301	1.8	169
463	Selective hydrogen purification through graphdiyne under ambient temperature and pressure. *Nanoscale*, **2012**, 4, 4587-93	7.7	167
462	Design and function of biomimetic multilayer water purification membranes. *Science Advances*, **2017**, 3, e1601939	14.3	161
461	Meso-origami: Folding multilayer graphene sheets. *Applied Physics Letters*, **2009**, 95, 123121	3.4	161
460	De novo composite design based on machine learning algorithm. *Extreme Mechanics Letters*, **2018**, 18, 19-28	3.9	160
459	Hierarchically Enhanced Impact Resistance of Bioinspired Composites. *Advanced Materials*, **2017**, 29, 1700060	24	159
458	Polymorphic regenerated silk fibers assembled through bioinspired spinning. *Nature Communications*, **2017**, 8, 1387	17.4	158
457	Entropic elasticity controls nanomechanics of single tropocollagen molecules. *Biophysical Journal*, **2007**, 93, 37-43	2.9	156
456	Hierarchies, multiple energy barriers, and robustness govern the fracture mechanics of alpha-helical and beta-sheet protein domains. *Proceedings of the National Academy of Sciences of the United States of America*, **2007**, 104, 16410-5	11.5	155
455	Structure-function-property-design interplay in biopolymers: spider silk. *Acta Biomaterialia*, **2014**, 10, 1612-26	10.8	151
454	First-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	150
453	Tearing graphene sheets from adhesive substrates produces tapered nanoribbons. *Small*, **2010**, 6, 1108-16	11	144
452	Theoretical and computational hierarchical nanomechanics of protein materials: Deformation and fracture. *Progress in Materials Science*, **2008**, 53, 1101-1241	42.2	144
451	Mesoscale modeling of mechanics of carbon nanotubes: Self-assembly, self-folding, and fracture. *Journal of Materials Research*, **2006**, 21, 2855-2869	2.5	142
450	Hydration of calcium oxide surface predicted by reactive force field molecular dynamics. *Langmuir*, **2012**, 28, 4187-97	4	139
449	Deformation rate controls elasticity and unfolding pathway of single tropocollagen molecules. *Journal of the Mechanical Behavior of Biomedical Materials*, **2009**, 2, 130-7	4.1	138

448	Structural hierarchies define toughness and defect-tolerance despite simple and mechanically inferior brittle building blocks. *Scientific Reports*, **2011**, 1, 35	4.9	135
447	Extended graphynes: simple scaling laws for stiffness, strength and fracture. *Nanoscale*, **2012**, 4, 7797-809	7.7	131
446	Hierarchical structure controls nanomechanical properties of vimentin intermediate filaments. *PLoS ONE*, **2009**, 4, e7294	3.7	129
445	Paraffin-enabled graphene transfer. *Nature Communications*, **2019**, 10, 867	17.4	122
444	Self-assembly of tetramers of 5,6-dihydroxyindole explains the primary physical properties of eumelanin: experiment, simulation, and design. *ACS Nano*, **2013**, 7, 1524-32	16.7	122
443	Deposition Mechanism and Properties of Thin Polydopamine Films for High Added Value Applications in Surface Science at the Nanoscale. *BioNanoScience*, **2012**, 2, 16-34	3.4	118
442	Osmotic pressure induced tensile forces in tendon collagen. *Nature Communications*, **2015**, 6, 5942	17.4	117
441	Liquid Exfoliated Natural Silk Nanofibrils: Applications in Optical and Electrical Devices. *Advanced Materials*, **2016**, 28, 7783-90	24	115
440	Protective role of Arapaima gigas fish scales: structure and mechanical behavior. *Acta Biomaterialia*, **2014**, 10, 3599-614	10.8	115
439	Strain controlled thermomutability of single-walled carbon nanotubes. *Nanotechnology*, **2009**, 20, 185701	3.4	115
438	Ultrathin Free-Standing Bombyx mori Silk Nanofibril Membranes. *Nano Letters*, **2016**, 16, 3795-800	11.5	113
437	Viscoelastic properties of model segments of collagen molecules. *Matrix Biology*, **2012**, 31, 141-9	11.4	112
436	Molecular level detection and localization of mechanical damage in collagen enabled by collagen hybridizing peptides. *Nature Communications*, **2017**, 8, 14913	17.4	111
435	Mechanics and molecular filtration performance of graphyne nanoweb membranes for selective water purification. *Nanoscale*, **2013**, 5, 11801-7	7.7	111
434	Polydopamine and eumelanin molecular structures investigated with calculations. *Chemical Science*, **2017**, 8, 1631-1641	9.4	111
433	Ultrathin thermoresponsive self-folding 3D graphene. *Science Advances*, **2017**, 3, e1701084	14.3	110
432	Integration of stiff graphene and tough silk for the design and fabrication of versatile electronic materials. *Advanced Functional Materials*, **2018**, 28, 1705291	15.6	109
431	Structural optimization of 3D-printed synthetic spider webs for high strength. *Nature Communications*, **2015**, 6, 7038	17.4	107

430	Molecular dynamics simulation of the α-helix to β-sheet transition in coiled protein filaments: evidence for a critical filament length scale. *Physical Review Letters*, **2010**, 104, 198304	7.4	107
429	Excitonic effects from geometric order and disorder explain broadband optical absorption in eumelanin. *Nature Communications*, **2014**, 5, 3859	17.4	106
428	Alzheimer's abeta(1-40) amyloid fibrils feature size-dependent mechanical properties. *Biophysical Journal*, **2010**, 98, 2053-62	2.9	106
427	Threshold crack speed controls dynamical fracture of silicon single crystals. *Physical Review Letters*, **2007**, 99, 165502	7.4	106
426	Tu(r)ning weakness to strength. *Nano Today*, **2010**, 5, 379-383	17.9	100
425	Packing efficiency and accessible surface area of crumpled graphene. *Physical Review B*, **2011**, 84,	3.3	99
424	Molecular and mesoscale mechanisms of osteogenesis imperfecta disease in collagen fibrils. *Biophysical Journal*, **2009**, 97, 857-65	2.9	99
423	Bone-Inspired Materials by Design: Toughness Amplification Observed Using 3D Printing and Testing . *Advanced Engineering Materials*, **2016**, 18, 1354-1363	3.5	99
422	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	1.8	97
421	Structural solution using molecular dynamics: Fundamentals and a case study of epoxy-silica interface. *International Journal of Solids and Structures*, **2011**, 48, 2131-2140	3.1	96
420	Deformation micromechanisms of collagen fibrils under uniaxial tension. *Journal of the Royal Society Interface*, **2010**, 7, 839-50	4.1	96
419	Molecular mechanics of polycrystalline graphene with enhanced fracture toughness. *Extreme Mechanics Letters*, **2015**, 2, 52-59	3.9	94
418	The Rise of Hierarchical Nanostructured Materials from Renewable Sources: Learning from Nature. *ACS Nano*, **2018**, 12, 7425-7433	16.7	91
417	Atomically Sharp Crack Tips in Monolayer MoS and Their Enhanced Toughness by Vacancy Defects. *ACS Nano*, **2016**, 10, 9831-9839	16.7	91
416	Materiomics: an -omics approach to biomaterials research. *Advanced Materials*, **2013**, 25, 802-24	24	90
415	High-Strength, Durable All-Silk Fibroin Hydrogels with Versatile Processability toward Multifunctional Applications. *Advanced Functional Materials*, **2018**, 28, 1704757	15.6	89
414	Structural and mechanical differences between collagen homo- and heterotrimers: relevance for the molecular origin of brittle bone disease. *Biophysical Journal*, **2012**, 102, 640-8	2.9	89
413	Modeling and additive manufacturing of bio-inspired composites with tunable fracture mechanical properties. *Soft Matter*, **2014**, 10, 4436-42	3.6	87

412	Predictive modelling-based design and experiments for synthesis and spinning of bioinspired silk fibres. *Nature Communications*, **2015**, 6, 6892	17.4	86
411	Twisted and coiled ultralong multilayer graphene ribbons. *Modelling and Simulation in Materials Science and Engineering*, **2011**, 19, 054003	2	86
410	Age- and diabetes-related nonenzymatic crosslinks in collagen fibrils: candidate amino acids involved in Advanced Glycation End-products. *Matrix Biology*, **2014**, 34, 89-95	11.4	85
409	Thickness of hydroxyapatite nanocrystal controls mechanical properties of the collagen-hydroxyapatite interface. *Langmuir*, **2012**, 28, 1982-92	4	85
408	Printing nature: Unraveling the role of nacre's mineral bridges. *Journal of the Mechanical Behavior of Biomedical Materials*, **2017**, 76, 135-144	4.1	84
407	Atomistic simulation of nanomechanical properties of Alzheimer's Abeta(1-40) amyloid fibrils under compressive and tensile loading. *Journal of Biomechanics*, **2010**, 43, 1196-201	2.9	82
406	Bio-inspired carbon nanotube-polymer composite yarns with hydrogen bond-mediated lateral interactions. *ACS Nano*, **2013**, 7, 3434-46	16.7	81
405	Biomimetic additive manufactured polymer composites for improved impact resistance. *Extreme Mechanics Letters*, **2016**, 9, 317-323	3.9	81
404	Printing of stretchable silk membranes for strain measurements. *Lab on A Chip*, **2016**, 16, 2459-66	7.2	80
403	Coarse-Grained Model of Collagen Molecules Using an Extended MARTINI Force Field. *Journal of Chemical Theory and Computation*, **2010**, 6, 1210-1218	6.4	80
402	Mechanical exfoliation of two-dimensional materials. *Journal of the Mechanics and Physics of Solids*, **2018**, 115, 248-262	5	78
401	Mechanomutable properties of a PAA/PAH polyelectrolyte complex: rate dependence and ionization effects on tunable adhesion strength. *Soft Matter*, **2010**, 6, 4175	3.6	78
400	Effect of wrinkles on the surface area of graphene: toward the design of nanoelectronics. *Nano Letters*, **2014**, 14, 6520-5	11.5	77
399	In silico assembly and nanomechanical characterization of carbon nanotube buckypaper. *Nanotechnology*, **2010**, 21, 265706	3.4	77
398	Atomistic model of the spider silk nanostructure. *Applied Physics Letters*, **2010**, 96, 153701	3.4	77
397	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, 15279-84	11.5	77
396	The effect of non-covalent functionalization on the thermal conductance of graphene/organic interfaces. *Nanotechnology*, **2013**, 24, 165702	3.4	75
395	Sub-nanometre channels embedded in two-dimensional materials. *Nature Materials*, **2018**, 17, 129-133	27	75

394	Three-Dimensional-Printing of Bio-Inspired Composites. *Journal of Biomechanical Engineering*, **2016**, 138, 021006	2.1	74
393	Biological Material Interfaces as Inspiration for Mechanical and Optical Material Designs. *Chemical Reviews*, **2019**, 119, 12279-12336	68.1	73
392	Advanced Structural Materials by Bioinspiration . *Advanced Engineering Materials*, **2017**, 19, 1600787	3.5	70
391	Additive Manufacturing Approaches for Hydroxyapatite-Reinforced Composites. *Advanced Functional Materials*, **2019**, 29, 1903055	15.6	70
390	Mechanism of friction in rotating carbon nanotube bearings. *Journal of the Mechanics and Physics of Solids*, **2013**, 61, 652-673	5	70
389	Asymptotic strength limit of hydrogen-bond assemblies in proteins at vanishing pulling rates. *Physical Review Letters*, **2008**, 100, 198301	7.4	70
388	Tensan Silk-Inspired Hierarchical Fibers for Smart Textile Applications. *ACS Nano*, **2018**, 12, 6968-6977	16.7	69
387	Molecular biomechanics of collagen molecules. *Materials Today*, **2014**, 17, 70-76	21.8	69
386	Spider dragline silk as torsional actuator driven by humidity. *Science Advances*, **2019**, 5, eaau9183	14.3	68
385	The minimal nanowire: Mechanical properties of carbyne. *Europhysics Letters*, **2011**, 95, 16002	1.6	68
384	Modelling the mechanics of partially mineralized collagen fibrils, fibres and tissue. *Journal of the Royal Society Interface*, **2014**, 11, 20130835	4.1	66
383	A constitutive model of soft tissue: from nanoscale collagen to tissue continuum. *Annals of Biomedical Engineering*, **2009**, 37, 1117-30	4.7	65
382	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, 153-61	4.1	65
381	Melanin Biopolymers: Tailoring Chemical Complexity for Materials Design. *Angewandte Chemie - International Edition*, **2020**, 59, 11196-11205	16.4	64
380	Silk-Its Mysteries, How It Is Made, and How It Is Used. *ACS Biomaterials Science and Engineering*, **2015**, 1, 864-876	5.5	63
379	A review of combined experimental and computational procedures for assessing biopolymer structure-process-property relationships. *Biomaterials*, **2012**, 33, 8240-55	15.6	63
378	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	4.1	62
377	Molecular asphaltene models based on Clar sextet theory. *RSC Advances*, **2015**, 5, 753-759	3.7	61

376	A single degree of freedom lollipop model for carbon nanotube bundle formation. *Journal of the Mechanics and Physics of Solids*, **2010**, 58, 409-427	5	61
375	Comparison of synthetic dopamine-eumelanin formed in the presence of oxygen and Cu2+ cations as oxidants. *Langmuir*, **2013**, 29, 12754-61	4	60
374	Failure of A(1-40) amyloid fibrils under tensile loading. *Biomaterials*, **2011**, 32, 3367-74	15.6	59
373	Self-folding of single- and multiwall carbon nanotubes. *Applied Physics Letters*, **2007**, 90, 073107	3.4	58
372	Defect-Tolerant Bioinspired Hierarchical Composites: Simulation and Experiment. *ACS Biomaterials Science and Engineering*, **2015**, 1, 295-304	5.5	57
371	Molecular deformation mechanisms of the wood cell wall material. *Journal of the Mechanical Behavior of Biomedical Materials*, **2015**, 42, 198-206	4.1	57
370	Impact tolerance in mussel thread networks by heterogeneous material distribution. *Nature Communications*, **2013**, 4, 2187	17.4	57
369	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	2	57
368	Alpha-helical protein networks are self-protective and flaw-tolerant. *PLoS ONE*, **2009**, 4, e6015	3.7	57
367	Design of Multistimuli Responsive Hydrogels Using Integrated Modeling and Genetically Engineered Silk-Elastin-Like Proteins. *Advanced Functional Materials*, **2016**, 26, 4113-4123	15.6	57
366	Geometry and temperature effects of the interfacial thermal conductance in copper- and nickel-graphene nanocomposites. *Journal of Physics Condensed Matter*, **2012**, 24, 245301	1.8	56
365	Thermal transport in monolayer graphene oxide: Atomistic insights into phonon engineering through surface chemistry. *Carbon*, **2014**, 77, 351-359	10.4	55
364	Superelasticity, energy dissipation and strain hardening of vimentin coiled-coil intermediate filaments: atomistic and continuum studies. *Journal of Materials Science*, **2007**, 42, 8771-8787	4.3	55
363	Dynamic pigmentary and structural coloration within cephalopod chromatophore organs. *Nature Communications*, **2019**, 10, 1004	17.4	54
362	Influence of geometry on mechanical properties of bio-inspired silica-based hierarchical materials. *Bioinspiration and Biomimetics*, **2012**, 7, 036024	2.6	54
361	Artificial intelligence and machine learning in design of mechanical materials. *Materials Horizons*, **2021**, 8, 1153-1172	14.4	54
360	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	16.7	53
359	Hydration and distance dependence of intermolecular shearing between collagen molecules in a model microfibril. *Journal of Biomechanics*, **2012**, 45, 2079-83	2.9	53

358	A Materiomics Approach to Spider Silk: Protein Molecules to Webs. *Jom*, **2012**, 64, 214-225	2.1	52
357	Characterization of the intrinsic strength between epoxy and silica using a multiscale approach. *Journal of Materials Research*, **2012**, 27, 1787-1796	2.5	52
356	The hidden structure of human enamel. *Nature Communications*, **2019**, 10, 4383	17.4	51
355	Secondary Structure Transition and Critical Stress for a Model of Spider Silk Assembly. *Biomacromolecules*, **2016**, 17, 427-36	6.9	51
354	Tuning heterogeneous poly(dopamine) structures and mechanics: in silico covalent cross-linking and thin film nanoindentation. *Soft Matter*, **2014**, 10, 457-64	3.6	51
353	Role of intrafibrillar collagen mineralization in defining the compressive properties of nascent bone. *Biomacromolecules*, **2014**, 15, 2494-500	6.9	51
352	Molecular mechanism of force induced stabilization of collagen against enzymatic breakdown. *Biomaterials*, **2012**, 33, 3852-9	15.6	51
351	Mesoscale mechanics of wood cell walls under axial strain. *Soft Matter*, **2013**, 9, 7138	3.6	51
350	Sequence–Structure–Property Relationships of Recombinant Spider Silk Proteins: Integration of Biopolymer Design, Processing, and Modeling. *Advanced Functional Materials*, **2013**, 23, 241-253	15.6	51
349	Single molecule effects of osteogenesis imperfecta mutations in tropocollagen protein domains. *Protein Science*, **2009**, 18, 161-8	6.3	51
348	Remarkably Distinct Mechanical Flexibility in Three Structurally Similar Semiconducting Organic Crystals Studied by Nanoindentation and Molecular Dynamics. *Chemistry of Materials*, **2019**, 31, 1391-1402	9.6	50
347	Design and Fabrication of Silk Templated Electronic Yarns and Applications in Multifunctional Textiles. *Matter*, **2019**, 1, 1411-1425	12.7	50
346	Coupled continuum and discrete analysis of random heterogeneous materials: Elasticity and fracture. *Journal of the Mechanics and Physics of Solids*, **2014**, 63, 481-490	5	50
345	Nanomechanical properties of vimentin intermediate filament dimers. *Nanotechnology*, **2009**, 20, 425101	3.4	49
344	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	5.7	49
343	Protein-free formation of bone-like apatite: New insights into the key role of carbonation. *Biomaterials*, **2017**, 127, 75-88	15.6	48
342	Molecular mechanics of mussel adhesion proteins. *Journal of the Mechanics and Physics of Solids*, **2014**, 62, 19-30	5	48
341	A multi-scale approach to understand the mechanobiology of intermediate filaments. *Journal of Biomechanics*, **2010**, 43, 15-22	2.9	48

340	Atomistic study of crack-tip cleavage to dislocation emission transition in silicon single crystals. *Physical Review Letters*, **2010**, 104, 235502	7.4	47
339	Bioinspired nanoporous silicon provides great toughness at great deformability. *Computational Materials Science*, **2010**, 48, 303-309	3.2	46
338	Electrospinning Piezoelectric Fibers for Biocompatible Devices. *Advanced Healthcare Materials*, **2020**, 9, e1901287	10.1	46
337	Optimization of Composite Fracture Properties: Method, Validation, and Applications. *Journal of Applied Mechanics, Transactions ASME*, **2016**, 83,	2.7	46
336	Intercalated water layers promote thermal dissipation at bio-nano interfaces. *Nature Communications*, **2016**, 7, 12854	17.4	45
335	Tunable nanomechanics of protein disulfide bonds in redox microenvironments. *Journal of the Mechanical Behavior of Biomedical Materials*, **2012**, 5, 32-40	4.1	45
334	Molecular mechanics of silk nanostructures under varied mechanical loading. *Biopolymers*, **2012**, 97, 408-17	2.7	44
333	Self-folding and aggregation of amyloid nanofibrils. *Nanoscale*, **2011**, 3, 1748-55	7.7	44
332	Synergetic material and structure optimization yields robust spider web anchorages. *Small*, **2013**, 9, 2747-56	11	43
331	Set in stone? A perspective on the concrete sustainability challenge. *MRS Bulletin*, **2012**, 37, 395-402	3.2	42
330	Biomateriomics. *Springer Series in Materials Science*, **2012**,	0.9	42
329	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, 11990-5	11.5	41
328	Intermediate filament-deficient cells are mechanically softer at large deformation: a multi-scale simulation study. *Acta Biomaterialia*, **2010**, 6, 2457-66	10.8	41
327	Atomistic and continuum studies of crack-like diffusion wedges and associated dislocation mechanisms in thin films on substrates. *Journal of the Mechanics and Physics of Solids*, **2003**, 51, 2105-2125	5	41
326	Atomistic Investigation of Load Transfer Between DWNT Bundles Crosslinked by PMMA Oligomers. *Advanced Functional Materials*, **2013**, 23, 1883-1892	15.6	40
325	Mutations alter the geometry and mechanical properties of Alzheimer's A(1-40) amyloid fibrils. *Biochemistry*, **2010**, 49, 8967-77	3.2	40
324	Large Deformation Mechanisms, Plasticity, and Failure of an Individual Collagen Fibril With Different Mineral Content. *Journal of Bone and Mineral Research*, **2016**, 31, 380-90	6.3	40
323	Computational smart polymer design based on elastin protein mutability. *Biomaterials*, **2017**, 127, 49-60	15.6	39

322	Variation of Weak Polyelectrolyte Persistence Length through an Electrostatic Contour Length. *Macromolecules*, **2012**, 45, 8067-8082	5.5	39
321	Nanoindentation study of size effects in nickel–graphene nanocomposites. *Philosophical Magazine Letters*, **2013**, 93, 196-203	1	39
320	Heat dissipation at a graphene-substrate interface. *Journal of Physics Condensed Matter*, **2012**, 24, 475305	2.8	39
319	Using Deep Learning to Predict Fracture Patterns in Crystalline Solids. *Matter*, **2020**, 3, 197-211	12.7	39
318	Multiscale Mechanics of Triply Periodic Minimal Surfaces of Three-Dimensional Graphene Foams. *Nano Letters*, **2018**, 18, 4845-4853	11.5	39
317	Nanoconfinement and the strength of biopolymers. *Annual Review of Biophysics*, **2013**, 42, 651-73	21.1	38
316	Structure and stability of the lamin A tail domain and HGPS mutant. *Journal of Structural Biology*, **2011**, 175, 425-33	3.4	38
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314	Atomistic and continuum studies of stress and strain fields near a rapidly propagating crack in a harmonic lattice. *Theoretical and Applied Fracture Mechanics*, **2004**, 41, 21-42	3.7	38
313	Nonlinear Viscous Water at Nanoporous Two-Dimensional Interfaces Resists High-Speed Flow through Cooperativity. *Nano Letters*, **2015**, 15, 3939-44	11.5	37
312	Structure-mechanics relationships of collagen fibrils in the osteogenesis imperfecta mouse model. *Journal of the Royal Society Interface*, **2015**, 12, 20150701	4.1	37
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