Ilia Valov

List of Publications by Year
in descending order

125 papers	9,064 citations	43973 48 h-index	40881 93 g-index
134 all docs	134 docs citations	134 times ranked	6411 citing authors

#	Article	IF	Citations
1	Electrochemical metallization memoriesâ€”fundamentals, applications, prospects. Nanotechnology, 2011, 22, 254003.	1.3	678
2	Nanoscale cation motion in TaOx, HfOx and TiOx memristive systems. Nature Nanotechnology, 2016, 11, 67-74.	15.6	524
3	Electrochemical dynamics of nanoscale metallic inclusions in dielectrics. Nature Communications, 2014, 5, 4232.	5.8	511
4	Nanobatteries in redox-based resistive switches require extension of memristor theory. Nature Communications, 2013, 4, 1771.	5.8	473
5	Recommended Methods to Study Resistive Switching Devices. Advanced Electronic Materials, 2019, 5, 1800143.	2.6	452
6	Electrochemical metallization memoriesâ€”fundamentals, applications, prospects. Nanotechnology, 2011, 22, 289502.	1.3	248
7	Effects of Moisture on the Switching Characteristics of Oxideâ€Based, Gaplessâ€Type Atomic Switches. Advanced Functional Materials, 2012, 22, 70-77.	7.8	247
8	Coexistence of Grainâ€Boundariesâ€Assisted Bipolar and Threshold Resistive Switching in Multilayer Hexagonal Boron Nitride. Advanced Functional Materials, 2017, 27, 1604811.	7.8	229
9	Multibit memory operation of metal-oxide bi-layer memristors. Scientific Reports, 2017, 7, 17532.	1.6	228
10	2022 roadmap on neuromorphic computing and engineering. Neuromorphic Computing and Engineering, 2022, 2, 022501.	2.8	217
11	Generic Relevance of Counter Charges for Cation-Based Nanoscale Resistive Switching Memories. ACS Nano, 2013, 7, 6396-6402.	7.3	216
12	Atomically controlled electrochemical nucleation at superionic solid electrolyte surfaces. Nature Materials, 2012, 11, 530-535.	13.3	208
13	Cation-based resistance change memory. Journal Physics D: Applied Physics, 2013, 46, 074005.	1.3	174
14	A chemically driven insulatorâ€“metal transition in non-stoichiometric and amorphous gallium oxide. Nature Materials, 2008, 7, 391-398.	13.3	166
15	Switching kinetics of electrochemical metallization memory cells. Physical Chemistry Chemical Physics, 2013, 15, 6945.	1.3	156
16	Silicon Oxide (SiO<i>_x</i>): A Promising Material for Resistance Switching?. Advanced Materials, 2018, 30, e1801187.	11.1	156
17	Redox Reactions at Cu,Ag/Ta₂O₅ Interfaces and the Effects of Ta₂O₅ Film Density on the Forming Process in Atomic Switch Structures. Advanced Functional Materials, 2015, 25, 6374-6381.	7.8	148
18	Redoxâ€Based Resistive Switching Memories (ReRAMs): Electrochemical Systems at the Atomic Scale. ChemElectroChem, 2014, 1, 26-36.	1.7	144

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19	Grapheneâ€Modified Interface Controls Transition from VCM to ECM Switching Modes in Ta/TaO<i>_x</i> Based Memristive Devices. Advanced Materials, 2015, 27, 6202-6207.	11.1	138
20	Quantum conductance and switching kinetics of AgI-based microcrossbar cells. Nanotechnology, 2012, 23, 145703.	1.3	134
21	Standards for the Characterization of Endurance in Resistive Switching Devices. ACS Nano, 2021, 15, 17214-17231.	7.3	128
22	Nanoscale electrochemistry using dielectric thin films as solid electrolytes. Nanoscale, 2016, 8, 13828-13837.	2.8	126
23	Nanoionic transport and electrochemical reactions in resistively switching silicon dioxide. Nanoscale, 2012, 4, 3040.	2.8	115
24	Self-limited single nanowire systems combining all-in-one memristive and neuromorphic functionalities. Nature Communications, 2018, 9, 5151.	5.8	115
25	Effects of moisture and redox reactions in VCM and ECM resistive switching memories. Journal Physics D: Applied Physics, 2018, 51, 413001.	1.3	107
26	Interfacial Metalâ€œOxide Interactions in Resistive Switching Memories. ACS Applied Materials & Interfaces, 2017, 9, 19287-19295.	4.0	103
27	Resistive Switching Mechanisms on TaO_{<i>x</i>} and SrRuO₃ Thin-Film Surfaces Probed by Scanning Tunneling Microscopy. ACS Nano, 2016, 10, 1481-1492.	7.3	100
28	Interfacial interactions and their impact on redox-based resistive switching memories (ReRAMs). Semiconductor Science and Technology, 2017, 32, 093006.	1.0	100
29	Recent Developments and Perspectives for Memristive Devices Based on Metal Oxide Nanowires. Advanced Electronic Materials, 2019, 5, 1800909.	2.6	94
30	Processes and Effects of Oxygen and Moisture in Resistively Switching TaO<i>_x</i> and HfO<i>_x</i>. Advanced Electronic Materials, 2018, 4, 1700458.	2.6	85
31	Electrocatalysts for bifunctional oxygen/air electrodes. Journal of Power Sources, 2008, 185, 727-733.	4.0	82
32	Nucleation and growth phenomena in nanosized electrochemical systems for resistive switching memories. Journal of Solid State Electrochemistry, 2013, 17, 365-371.	1.2	80
33	Impact of the Counterâ€Electrode Material on Redox Processes in Resistive Switching Memories. ChemElectroChem, 2014, 1, 1287-1292.	1.7	78
34	Redox processes in silicon dioxide thin films using copper microelectrodes. Applied Physics Letters, 2011, 99, .	1.5	77
35	Brainâ€Inspired Structural Plasticity through Reweighting and Rewiring in Multiâ€Terminal Selfâ€Organizing Memristive Nanowire Networks. Advanced Intelligent Systems, 2020, 2, 2000096.	3.3	72
36	Electrochemical Tantalum Oxide for Resistive Switching Memories. Advanced Materials, 2017, 29, 1703357.	11.1	69

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37	Oxide nitrides: From oxides to solids with mobile nitrogen ions. Progress in Solid State Chemistry, 2009, 37, 81-131.	3.9	66
38	Design of defect-chemical properties and device performance in memristive systems. Science Advances, 2020, 6, eaaz9079.	4.7	65
39	Volatile resistance states in electrochemical metallization cells enabling non-destructive readout of complementary resistive switches. Nanotechnology, 2014, 25, 425202.	1.3	64
40	Active Electrode Redox Reactions and Device Behavior in ECM Type Resistive Switching Memories. Advanced Electronic Materials, 2019, 5, 1800933.	2.6	64
41	Nanoarchitectonics for Controlling the Number of Dopant Atoms in Solid Electrolyte Nanodots. Advanced Materials, 2018, 30, 1703261.	11.1	59
42	Oxygen Exchange Processes between Oxide Memristive Devices and Water Molecules. Advanced Materials, 2018, 30, e1800957.	11.1	57
43	Electrochemical deposition of thin zirconia films on stainless steel 316 L. Materials Chemistry and Physics, 2000, 65, 222-225.	2.0	56
44	Nanobattery Effect in RRAMsâ€"Implications on Device Stability and Endurance. IEEE Electron Device Letters, 2014, 35, 208-210.	2.2	56
45	Defect chemistry of the cage compound, Ca12Al14O33â^'Î´â€"understanding the route from a solid electrolyte to a semiconductor and electride. Physical Chemistry Chemical Physics, 2009, 11, 3105.	1.3	55
46	SET kinetics of electrochemical metallization cells: influence of counter-electrodes in SiO₂/Ag based systems. Nanotechnology, 2017, 28, 135205.	1.3	55
47	Electrochemical processes and device improvement in conductive bridge RAM cells. Physica Status Solidi (A) Applications and Materials Science, 2016, 213, 274-288.	0.8	52
48	Bond nature of active metal ions in SiO2-based electrochemical metallization memory cells. Nanoscale, 2013, 5, 1781.	2.8	50
49	Direct Probing of the Dielectric Scavenging-Layer Interface in Oxide Filamentary-Based Valence Change Memory. ACS Applied Materials & Interfaces, 2017, 9, 10820-10824.	4.0	50
50	Humidity effects on the redox reactions and ionic transport in a Cu/Ta₂O₅/Pt atomic switch structure. Japanese Journal of Applied Physics, 2016, 55, 06GJ09.	0.8	49
51	Faradaic currents during electroforming of resistively switching Agâ€"Geâ€"Se type electrochemical metallization memory cells. Physical Chemistry Chemical Physics, 2009, 11, 5974.	1.3	47
52	Capacity based nondestructive readout for complementary resistive switches. Nanotechnology, 2011, 22, 395203.	1.3	45
53	An associative capacitive network based on nanoscale complementary resistive switches for memory-intensive computing. Nanoscale, 2013, 5, 5119.	2.8	44
54	Ag/GeSx/Pt-based complementary resistive switches for hybrid CMOS/Nanoelectronic logic and memory architectures. Scientific Reports, 2013, 3, 2856.	1.6	44

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55	Rate-limiting processes in the fast SET operation of a gapless-type Cu-Ta2O5 atomic switch. AIP Advances, 2013, 3, .	0.6	43
56	Electrode activation and degradation: Morphology changes of platinum electrodes on YSZ during electrochemical polarisation. Solid State Ionics, 2008, 179, 1835-1848.	1.3	42
57	Direct Observation of Charge Transfer in Solid Electrolyte for Electrochemical Metallization Memory. Advanced Materials, 2012, 24, 4552-4556.	11.1	42
58	Organic memristors come of age. Nature Materials, 2017, 16, 1170-1172.	13.3	41
59	Electrochemical growth of thin La2O3 films on oxide and metal surfaces. Materials Science and Engineering C, 2003, 23, 123-128.	3.8	39
60	Ordering and Phase Control in Epitaxial Double-Perovskite Catalysts for the Oxygen Evolution Reaction. ACS Catalysis, 2017, 7, 7029-7037.	5.5	35
61	Comment on <i>Realâ€Time Observation on Dynamic Growth/Dissolution of Conductive Filaments in Oxideâ€Electrolyteâ€•Based ReRAM</i>. Advanced Materials, 2013, 25, 162-164.	11.1	34
62	Ionic and electronic conductivity of nitrogen-doped YSZ single crystals. Solid State Ionics, 2009, 180, 1463-1470.	1.3	33
63	Thermodynamics, structure and kinetics in the system Gaâ€“Oâ€“N. Progress in Solid State Chemistry, 2009, 37, 132-152.	3.9	33
64	Modeling of Quantized Conductance Effects in Electrochemical Metallization Cells. IEEE Nanotechnology Magazine, 2015, 14, 505-512.	1.1	33
65	Quantum Conductance in Memristive Devices: Fundamentals, Developments, and Applications. Advanced Materials, 2022, 34, e2201248.	11.1	31
66	Chemical composition and corrosion resistance of passive chromate films formed on stainless steels 316 L and 1.4301. Materials Chemistry and Physics, 2002, 73, 252-258.	2.0	30
67	Physical origins and suppression of Ag dissolution in GeS_x-based ECM cells. Physical Chemistry Chemical Physics, 2014, 16, 18217.	1.3	30
68	Stability and Degradation of Perovskite Electrocatalysts for Oxygen Evolution Reaction. Electrochimica Acta, 2016, 218, 156-162.	2.6	29
69	Electrochemically prepared oxides for resistive switching memories. Faraday Discussions, 2019, 213, 165-181.	1.6	29
70	Design of Materials Configuration for Optimizing Redoxâ€Based Resistive Switching Memories. Advanced Materials, 2022, 34, e2105022.	11.1	28
71	Study of the kinetics of processes during electrochemical deposition of zirconia from nonaqueous electrolytes. Electrochimica Acta, 2002, 47, 4419-4431.	2.6	27
72	Proton mobility in SiO₂ thin films and impact of hydrogen and humidity on the resistive switching effect. Materials Research Society Symposia Proceedings, 2011, 1330, 30201.	0.1	26

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73	Electrochemically prepared oxides for resistive switching devices. Electrochimica Acta, 2018, 274, 103-111.	2.6	25
74	Water-Mediated Ionic Migration in Memristive Nanowires with a Tunable Resistive Switching Mechanism. ACS Applied Materials & Interfaces, 2020, 12, 48773-48780.	4.0	23
75	Chemically-inactive interfaces in thin film Ag/AgI systems for resistive switching memories. Scientific Reports, 2013, 3, 1169.	1.6	22
76	Preparation and characterization of GeSx thin-films for resistive switching memories. Thin Solid Films, 2013, 527, 299-302.	0.8	22
77	Ionic Modulation of Electrical Conductivity of ZnO Due to Ambient Moisture. Advanced Materials Interfaces, 2019, 6, 1900803.	1.9	22
78	Electrolysis of Water at Atomically Tailored Epitaxial Cobaltite Surfaces. Chemistry of Materials, 2019, 31, 2337-2346.	3.2	22
79	Processes and Limitations during Filament Formation and Dissolution in GeS_{<i>x</i>}-based ReRAM Memory Cells. Journal of Physical Chemistry C, 2015, 119, 18678-18685.	1.5	20
80	Pr_xBa_{1-x}CoO₃Oxide Electrodes for Oxygen Evolution Reaction in Alkaline Solutions by Chemical Solution Deposition. Journal of the Electrochemical Society, 2016, 163, F166-F170.	1.3	20
81	Preparation of nitrogen-doped YSZ thin films by pulsed laser deposition and their characterization. Journal of Materials Science, 2007, 42, 1931-1941.	1.7	19
82	Electrochemical activation of molecular nitrogen at the Ir/YSZ interface. Physical Chemistry Chemical Physics, 2011, 13, 3394.	1.3	18
83	Degradation Kinetics during Oxygen Electrocatalysis on Perovskite-Based Surfaces in Alkaline Media. Langmuir, 2018, 34, 1347-1352.	1.6	18
84	Understanding the conductive channel evolution in Na:WO_{3âˆ’x}-based planar devices. Nanoscale, 2015, 7, 6023-6030.	2.8	15
85	Electrochemical Incorporation of Nitrogen into a Zirconia Solid Electrolyte. Electrochemical and Solid-State Letters, 2006, 9, F23.	2.2	13
86	Simulation of polarity independent RESET in electrochemical metallization memory cells. , 2013, , .		13
87	(Invited) Mobile Ions, Transport and Redox Processes in Memristive Devices. ECS Transactions, 2016, 75, 27-39.	0.3	13
88	Structureâ€Dependent Influence of Moisture on Resistive Switching Behavior of ZnO Thin Films. Advanced Materials Interfaces, 2021, 8, 2100915.	1.9	13
89	Kinetic studies of the electrochemical nitrogen reduction and incorporation into yttria stabilized zirconia. Solid State Ionics, 2006, 177, 1619-1624.	1.3	12
90	Nitrogen Tracer Diffusion in Yttria Doped Zirconium Oxonitride. Defect and Diffusion Forum, 2005, 237-240, 479-484.	0.4	11

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91	Spring-Like Pseudoelectroelasticity of Monocrystalline Cu₂S Nanowire. Nano Letters, 2018, 18, 5070-5077.	4.5	11
92	Memristors with alloyed electrodes. Nature Nanotechnology, 2020, 15, 510-511.	15.6	11
93	Comment on â€œDynamic Processes of Resistive Switching in Metallic Filament-Based Organic Memory Devicesâ€• Journal of Physical Chemistry C, 2013, 117, 11878-11880.	1.5	10
94	An EMF cell with a nitrogen solid electrolyteâ€"on the transference of nitrogen ions in yttria-stabilized zirconia. Physical Chemistry Chemical Physics, 2011, 13, 1239-1242.	1.3	8
95	(Keynote) Atomic Scale and Interface Interactions in Redox-Based Resistive Switching Memories. ECS Transactions, 2014, 64, 3-18.	0.3	8
96	Resistivity control by the electrochemical removal of dopant atoms from a nanodot. Faraday Discussions, 2019, 213, 29-40.	1.6	8
97	Electrochemical Reactions in Nanoionics - Towards Future Resistive Switching Memories. ECS Transactions, 2009, 25, 431-437.	0.3	7
98	Ionic conductivity of low yttria-doped cubic zirconium oxide nitride single crystals. Solid State Ionics, 2016, 296, 42-46.	1.3	7
99	Phase-change memories (PCM) â€" Experiments and modelling: general discussion. Faraday Discussions, 2019, 213, 393-420.	1.6	7
100	Memristive devices based on single ZnO nanowiresâ€"from material synthesis to neuromorphic functionalities. Semiconductor Science and Technology, 2022, 37, 034002.	1.0	7
101	Formingâ€Free Resistive Switching of Electrochemical Titanium Oxide Localized Nanostructures: Anodization, Chemical Composition, Nanoscale Size Effects, and Memristive Storage. Advanced Electronic Materials, 2022, 8, .	2.6	7
102	New insights into redox based resistive switches. , 2013, , .		6
103	Impact of moisture absorption on the resistive switching characteristics of a polyethylene oxide-based atomic switch. Journal of Materials Chemistry C, 2021, 9, 11198-11206.	2.7	6
104	Influence of Graphene Interlayers on Electrode-Electrolyte Interfaces in Resistive Random Accesses Memory Cells. Materials Research Society Symposia Proceedings, 2015, 1729, 29-34.	0.1	5
105	Electrochemistry at the Nanoscale. Nanoscale, 2016, 8, 13825-13827.	2.8	5
106	Electrochemical metallization ReRAMs (ECM) - Experiments and modelling: general discussion. Faraday Discussions, 2019, 213, 115-150.	1.6	5
107	Copper facilitated nickel oxy-hydroxide films as efficient synergistic oxygen evolution electrocatalyst. Journal of Catalysis, 2020, 384, 189-198.	3.1	5
108	Statistical modeling of electrochemical metallization memory cells. , 2014, , .		4

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109	Editorial for the JECR special issue on resistive switching: Oxide materials, mechanisms, and devices. Journal of Electroceramics, 2017, 39, 1-3.	0.8	4
110	Brainâ€Inspired Structural Plasticity through Reweighting and Rewiring in Multiâ€Terminal Selfâ€Organizing Memristive Nanowire Networks. Advanced Intelligent Systems, 2020, 2, 2080071.	3.3	4
111	Impact of Zr top electrode on tantalum oxide-based electrochemical metallization resistive switching memory: towards synaptic functionalities. RSC Advances, 2022, 12, 14235-14245.	1.7	4
112	Silicon memristors go electric. Nature Electronics, 2019, 2, 56-57.	13.1	3
113	(Invited) The Role of Electrochemical Interfaces in ReRAM Memory Cells. ECS Transactions, 2013, 58, 189-196.	0.3	2
114	Quantum size effects and non-equilibrium states in nanoscale silicon dioxide based resistive switches. , 2014, , .		2
115	Synaptic and neuromorphic functions: general discussion. Faraday Discussions, 2019, 213, 553-578.	1.6	2
116	Valence change ReRAMs (VCM) - Experiments and modelling: general discussion. Faraday Discussions, 2019, 213, 259-286.	1.6	2
117	Live demonstration: An associative capacitive network based on nanoscale complementary resistive switches. , 2014, , .		1
118	Electrocatalysts and Electrode Design for Bifunctional Oxygen/Air Electrodes. NATO Science for Peace and Security Series B: Physics and Biophysics, 2008, , 305-310.	0.2	1
119	Memristively programmable transistors. Nanotechnology, 2022, 33, 045203.	1.3	1
120	Defect Chemistry and Transport Properties of Nitrogenâ€Doped YSZ. Zeitschrift Fur Anorganische Und Allgemeine Chemie, 2008, 634, 2011-2011.	0.6	0
121	Oxide Thin Films for Memristive Devices. , 2018, , 346-356.		0
122	Preface. Faraday Discussions, 2019, 213, 9-10.	1.6	0
123	(Invited) Mobile Ions, Transport and Redox Processes in Memristive Devices. ECS Meeting Abstracts, 2016, , .	0.0	0
124	Anodic Oxides As Electrolytes for Resistive Switching Devices. ECS Meeting Abstracts, 2017, , .	0.0	0
125	Nanoscale Electrochemical Studies: How Can We Use the Atomic Switch. Advances in Atom and Single Molecule Machines, 2020, , 73-93.	0.0	0