Citation Evidence Report

EB-1A Petition — Original Contributions of Major Significance

8 CFR § 204.5(h)(3)(v) · Criterion 5

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Google Scholar profile

Generated 2026-05-21 by CiteMap. This report organises Google Scholar citation data into the structure USCIS adjudicators apply to Criterion 5 (original contributions of major significance). It is a drafting aid for the petitioner's counsel — not legal advice, and not a guarantee of any outcome. All figures must be verified, and citation counts re-snapshotted as of the petition filing date, before use in a filing.

A. Overview & Filtering Statement

7,799	9,533	20	70
Citing papers mapped	Citation edges	Home papers mapped	h-index (GS)

Filtering statement — methodology & limits

Citation **independence** is classified per citing paper by comparing the citing paper's authors to this scholar. *Self* citations are those where the scholar is an author of the citing work; *co-author* citations are by the scholar's known collaborators; *same-institution* citations are by authors affiliated with the scholar's institution(s); all remaining classified citations are *independent*. Per AAO practice, only independent citations are treated as probative of influence beyond the scholar's own circle.

Known limitations — counsel must verify. (1) Collaborator identification draws on the co-author list published on the Google Scholar profile; a collaborator not listed there may be missed, so the independent share below should be read as an **upper bound**. (2) Citation counts are a crawl-time snapshot; eligibility is judged as of the petition filing date and post-filing citations carry no weight — re-snapshot before filing. (3) Citations that could not be classified (no author data) are excluded from the percentages and reported separately.

B. Citation Independence

The AAO credits citations only where they show influence **beyond the scholar's own circle**. Self-citations and co-author citations are expressly discounted; the independent share below is the load-bearing figure.

89.5% independent of 229 classified citing papers

Citation type	Count
Independent	205
Self-citation	5
Co-author	19
Same-institution	0

7,570 citing papers could not be classified (no author data) and are excluded from the percentages above.

C. Significant Contributions & Their Citation Evidence

Each contribution below is presented as the AAO expects: a specific claim, followed by the **independent** citation evidence for the paper(s) that carry it. Citation counts are stated **per article**, never as a body-of-work total — the AAO holds aggregate totals to be a final-merits signal, not Criterion-5 evidence.

Where the data allows, a paper also shows its **field-normalised** standing — how its citation count ranks against Semantic Scholar papers in the same field and publication year. The comparison field is named explicitly; counsel should confirm it is the appropriate one, as the AAO scrutinises a petitioner's choice of comparison field.

Contribution 1

Claim — Contribution 1

The researcher pioneered coaxial silicon nanowire technology for solar cells and nanoelectronic power sources, establishing a foundational framework for single nanowire photovoltaics and optically controlled biointerfaces.

The researcher's core contribution rests on the 2007 publication 'Coaxial silicon nanowires as solar cells and nanoelectronic power sources,' which appears to have established a novel structural approach to energy conversion at the nanoscale. This seminal work serves as the foundation for a sustained line of inquiry into silicon-based nanodevices.

This line of work appears to address the challenge of integrating photovoltaic functionality with nanoelectronic applications. The progression from the 2007 core paper to the 2009 review on 'Single nanowire photovoltaics' and the 2018 study on 'Rational design of silicon structures for optically controlled multiscale biointerfaces' suggests an evolution from fundamental device physics to broader applications in bio-integration and rational material design.

The significance of this contribution is evidenced by the core paper's 3,624 citations, indicating widespread adoption of the coaxial nanowire concept. Furthermore, the high citation counts of the follow-up works (698 and 277 citations, respectively) and the fact that 97.8% of classified citations originate from independent researchers demonstrate that this framework has been extensively utilized and validated by the broader scientific community beyond the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 113 · **1 flagged influential by Semantic Scholar**

CORE PAPER

Coaxial silicon nanowires as solar cells and nanoelectronic power sources

2007 · 3,624 citations (GS)

Field-normalised: 2,784 Semantic Scholar citations place it in the top 1% of Engineering papers from 2007 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Silicon nanowires for photovoltaic solar energy conversion	Beijing Normal University, City University of Hong Kong	China	—
2	Hybrid Nanostructures for Energy Storage Applications	Rice University	United States	—
3	25th anniversary article: semiconductor nanowires--synthesis, characterization, and applications.	University of California Berkeley	United States	—
4	Electroactive Biomaterials and Systems for Cell Fate Determination and Tissue Regeneration: Design and Applications (2021)	—	—	—
5	One-dimensional ZnO nanostructures: solution growth and functional properties (2011)	Georgia Institute of Technology	United States	—
6	Nanotechnology development in surgical applications: recent trends and developments (2023)	Kerman University of Medical Science, Kerman University of Medical Sciences	Iran	Background
7	Nanotechnology-enabled energy harvesting for self-powered micro-/nanosystems (2012)	Georgia Institute of Technology	United States	—
8	Self-powered nanoscale photodetectors	Soochow University	China	—
9	Nanowire electronics: from nanoscale to macroscale	University of California, Los Angeles, University of California, Los Angeles (UCLA)	United States	—

No.	Citing paper	Citing institution(s)	Country	S2
10	Electrospun ultralong hierarchical vanadium oxide nanowires with high performance for lithium ion batteries	Wuhan University of Technology	China	—
11	Construction of high-capacitance 3D CoO@ polypyrrole nanowire array electrode for aqueous asymmetric supercapacitor (2013)	Central China Normal University	China	—
12	Nanowire Solar Cells	Stanford University	United States	Influential
13	Reviving vibration energy harvesting and self-powered sensing by a triboelectric nanogenerator (2017)	Georgia Institute of Technology	United States	—
14	Nanowire photodetectors	University of California, San Diego	United States	—
15	Single-layer MoS2 nanopores as nanopower generators (2016)	EPFL, University of Illinois at Urbana-Champaign	Switzerland, United States	—
16	Micro-cable structured textile for simultaneously harvesting solar and mechanical energy (2016)	Chongqing University, Georgia Institute of Technology	China, United States	—
17	Self-powered, ultrafast, visible-blind UV detection and optical logical operation based on ZnO/GaN nanoscale p-n junctions	Peking University	China	—
18	Towards high efficiency nanowire solar cells	Lund University	Sweden	—
19	Self-powered cardiovascular electronic devices and systems	Chinese Academy of Sciences, Georgia Institute of Technology, Renmin Hospital of Wuhan University	China, United States	—
20	Sliding-triboelectric nanogenerators based on in-plane charge-separation mechanism.	Georgia Institute of Technology	United States	—
21	Piezoelectric $BaTiO_3$ thin film nanogenerator on plastic substrates.	Korea Advanced Institute of Science and Technology (KAIST)	South Korea	—
22	Theoretical comparison, equivalent transformation, and conjunction operations of electromagnetic induction generator and triboelectric nanogenerator for harvesting mechanical energy.	Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences	China	—
23	Flexible high-output nanogenerator based on lateral ZnO nanowire array.	Georgia Institute of Technology	United States	—
24	Recent Progress in Application-Oriented Self-Powered Microelectronics	Guizhou University, Southwest Jiaotong University, The Hong Kong Polytechnic University	China, PR China	—
25	Waving potential in graphene	Nanjing University of Aeronautics and Astronautics	China	—
26	Piezoelectric-nanowire-enabled power source for driving wireless microelectronics	Georgia Institute of Technology	United States	Background
27	Highly durable all-fiber nanogenerator for mechanical energy harvesting	The Hong Kong Polytechnic University	Hong Kong	—

No.	Citing paper	Citing institution(s)	Country	S2
28	BaTiO3 Nanotubes-Based Flexible and Transparent Nanogenerators.	Georgia Institute of Technology	United States	—
29	Hybridizing energy conversion and storage in a mechanical-to-electrochemical process for self-charging power cell.	Georgia Institute of Technology	United States	—
30	Amorphous vanadium oxide matrixes supporting hierarchical porous Fe3O4/graphene nanowires as a high-rate lithium storage anode.	Wuhan University of Technology	China	—

Showing the 30 most-cited of 82 independent citing papers.

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

FOLLOW-UP WORK

Rational design of silicon structures for optically controlled multiscale biointerfaces

2018 · 277 citations (GS)

Field-normalised: 218 Semantic Scholar citations place it in the top 5% of Materials Science papers from 2018 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Recent progress in three-terminal artificial synapses: from device to system (2019)	Nankai University	China	—
2	Janus microparticles-based targeted and spatially-controlled piezoelectric neural stimulation via low-intensity focused ultrasound (2024)	Max Planck Institute for Intelligent Systems	Germany	—
3	Chronic electrical stimulation of peripheral nerves via deep-red light transduced by an implanted organic photocapacitor (2022)	Columbia University, Columbia University Medical Center, Linköping University	Croatia, Sweden, United States	—
4	Next-generation interfaces for studying neural function (2019)	Massachusetts Institute of Technology	United States	—
5	Implantable aptamer–field-effect transistor neuroprobes for in vivo neurotransmitter monitoring (2021)	University of California, Los Angeles	United States	—
6	Wearable and Implantable Electroceuticals for Therapeutic Electrostimulations.	University of Wisconsin-Madison	United States	—
7	Integrating Hard Silicon for High-Performance Soft Electronics via Geometry Engineering.	Nanjing University, Yangzhou University	China	—
8	Technical roadmap of ultra-thin crystalline silicon-based bioelectronics	Yonsei University	South Korea	—
9	Beyond 25 years of biomedical innovation in nano-bioelectronics	—	—	Background

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

FOLLOW-UP WORK

Single nanowire photovoltaics

2009 · Chemical Society Reviews · 698 citations (GS)

Field-normalised: 492 Semantic Scholar citations place it in the top 1% of Physics papers from 2009 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Silicon nanowires for photovoltaic solar energy conversion (2011)	Beijing Normal University, City University of Hong Kong	China	—
2	Hybrid Nanostructures for Energy Storage Applications (2012)	Rice University	United States	—
3	Porous One-Dimensional Nanomaterials: Design, Fabrication and Applications in Electrochemical Energy Storage (2017)	University of California, Los Angeles, Wuhan University of Technology	China, United States	—
4	One-Dimensional Earth-Abundant Nanomaterials for Water-Splitting Electrocatalysts (2017)	Fudan University	China	—
5	Self-powered nanoscale photodetectors (2017)	Soochow University	China	—
6	Nanowire electronics: from nanoscale to macroscale	University of California, Los Angeles, University of California, Los Angeles (UCLA)	United States	—
7	Construction of high-capacitance 3D CoO@ polypyrrole nanowire array electrode for aqueous asymmetric supercapacitor (2013)	Central China Normal University	China	—
8	Semiconductor quantum dots and quantum dot arrays and applications of multiple exciton generation to third-generation photovoltaic solar cells (2010)	National Renewable Energy Laboratory, University of California, Irvine, University of Toledo	United States	—
9	Towards highly efficient photocatalysts using semiconductor nanoarchitectures (2012)	University of California, Los Angeles (UCLA)	United States	—
10	Nanowire Solar Cells (2011)	Stanford University	United States	—
11	Nanowire photodetectors	University of California, San Diego	United States	—
12	Challenges and opportunities in low-dimensional thermoelectric nanomaterials. (2023)	Institute of Materials Research and Engineering (IMRE), A*STAR, Nanyang Normal University, Nanyang Technological University	China, Singapore	—
13	Towards high efficiency nanowire solar cells	Lund University	Sweden	—
14	Single-nanowire spectrometers (2019)	Aalto University, King's College London, Nanjing University	China, Finland, United Kingdom	Background

No.	Citing paper	Citing institution(s)	Country	S2
15	Characterizing and Optimizing Piezoelectric Response of ZnO Nanowire/PMMA Composite-Based Sensor	Université de Lyon, Université de Lyon and INSA-Lyon, Univ. Grenoble Alpes	France	Background
16	Piezoresistive Response of Quasi-One-Dimensional ZnO Nanowires Using an in Situ Electromechanical Device.	Bruker Nano Surfaces, Kiel University, University of California Berkeley	Denmark, Germany, United States	—
17	On-chip micro/nano devices for energy conversion and storage	Peking University, University of Warwick, University of Washington	China, United Kingdom, United States	—
18	Single crystalline lead zirconate titanate (PZT) nano/micro-wire based self-powered UV sensor	Georgia Institute of Technology, Lanzhou University	China, United States	—
19	Plasmonic enhancements of photocatalytic activity of Pt/n-Si/Ag photodiodes using Au/Ag core/shell nanorods.	University of California, Los Angeles	United States	—
20	Recent Advances in 1D Nanomaterial-Based Bioelectronics for Healthcare Applications	Korea Institute of Science and Technology (KIST), Seoul National University, Stanford University	South Korea, United States	—
21	Wafer-scale nanopatterning and translation into high-performance piezoelectric nanowires.	Princeton University	United States	—
22	Atomic level deposition to extend Moore's law and beyond	Huazhong University of Science and Technology, Huazhong University of Science & Technology, Incheon National University	China, South Korea	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology* / *Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Contribution 2

Claim — Contribution 2

The researcher pioneered the synthesis of large-pore cubic mesoporous single crystals using nonionic block copolymers and inorganic salts, establishing a foundational method for advanced material fabrication.

The researcher established a foundational methodology for synthesizing large-pore cubic mesoporous single crystals through the use of nonionic block copolymers and inorganic salts, as detailed in a seminal 2002 JACS paper. This core contribution appears to address the challenge of creating ordered, crystalline mesoporous structures with enhanced pore accessibility, a significant advancement in materials chemistry at the time.

Building on this initial breakthrough, the researcher expanded the utility of these materials in subsequent highly cited works. A 2003 study focused on cubic mesoporous silica with controllable entrance sizes, suggesting an effort to refine adsorption properties. Another 2003 publication in Advanced Materials described a general synthesis method for ordered metal oxide nanoarrays replicated from microwave-digested mesoporous silica, indicating a broader application of the templating strategy to diverse inorganic systems.

The impact of this line of work is evidenced by substantial citation counts, with the core paper accumulating 374 citations and the follow-up studies garnering 747 and 534 citations respectively. Furthermore, analysis of citing literature reveals that 97.8% of citations originate from independent researchers, underscoring the broad adoption and significance of these methods across the global scientific community.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 26

CORE PAPER

Nonionic Block Copolymer Synthesis of Large-Pore Cubic Mesoporous Single Crystals by Use of Inorganic Salts

2002 · Journal of the American Chemical Society (JACS) · 374 citations (GS)

Field-normalised: 260 Semantic Scholar citations place it in the top 5% of Chemistry papers from 2002 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Functional Mesoporous Silica Nanomaterials for Catalysis and Environmental Applications (2020)	The University of Queensland, The University of Tokyo, University of Aveiro	Australia, Japan, Portugal	—
2	Chemistry of Zeolites and Related Porous Materials: Synthesis and Structure (2007)	Jilin University	China	—
3	Dendritic fibrous nanosilica for catalysis, energy harvesting, carbon dioxide mitigation, drug delivery, and sensing (2017)	Tata Institute of Fundamental Research	India	—
4	Hydrothermal growth of ZnO nanostructures (2009)	Asian Institute of Technology	Thailand	—
5	High-surface-area silica nanospheres (KCC-1) with a fibrous morphology (2010)	King Abdullah University of Science and Technology	Saudi Arabia	—
6	Ordered mesoporous silica with large cage-like pores: structural identification and pore connectivity design by controlling the synthesis temperature and time (2003)	High Energy Accelerator Research Organization (KEK), Kent State University, Michigan State University	Brazil, Japan, United States	—
7	Design and fabrication of mesoporous heterogeneous basic catalysts (2015)	Nanjing Tech University, Texas A&M University	China, United States	—
8	A novel anionic surfactant templating route for synthesizing mesoporous silica with unique structure (2003)	Ajinomoto Co., Inc., Stockholm University, Tokyo Institute of Technology	Japan, Sweden	—
9	Block copolymer-templated mesoporous oxides (2003)	Université Pierre et Marie Curie (Paris VI)	France	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

FOLLOW-UP WORK

Cubic mesoporous silica with large controllable entrance sizes and advanced adsorption properties

2003 · 747 citations (GS)

Field-normalised: 475 Semantic Scholar citations place it in the top 1% of Chemistry papers from 2003 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Mesoporous Carbon Materials: Synthesis and Modification	Oak Ridge National Laboratory	United States	—
2	Multifunctional mesoporous silica nanoparticles for biomedical applications	Beijing Jishuitan Hospital, Beijing University of Chemical Technology	China	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

FOLLOW-UP WORK

General synthesis of ordered crystallized metal oxide nanoarrays replicated by microwave-digested mesoporous silica

2003 · Advanced Materials · 534 citations (GS)

Field-normalised: 369 Semantic Scholar citations place it in the top 5% of Materials Science papers from 2003 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Functional Mesoporous Silica Nanomaterials for Catalysis and Environmental Applications	The University of Queensland, The University of Tokyo, University of Aveiro	Australia, Japan, Portugal	—
2	Ordered Mesoporous In_2O_3: Synthesis by Structure Replication and Application as a Methane Gas Sensor	Justus Liebig University Giessen	Germany	—
3	Chemistry of Zeolites and Related Porous Materials: Synthesis and Structure (2007)	Jilin University	China	—
4	Porous metal oxides as gas sensors (2007)	Paderborn University, University of Paderborn, University of Paderborn (Universität Paderborn)	Germany	—
5	Nanostructured cobalt oxide clusters in mesoporous silica as efficient oxygen-evolving catalysts (2009)	Lawrence Berkeley National Laboratory	United States	—
6	Spinels: Controlled Preparation, Oxygen Reduction/Evolution Reaction Application, and Beyond	Nankai University	China	—
7	MCM-48-like large mesoporous silicas with tailored pore structure: facile synthesis domain in a ternary triblock copolymer– butanol– water system (2005)	Korea Advanced Institute of Science and Technology (KAIST)	South Korea	—
8	On the synergetic catalytic effect in heterogeneous nanocomposite catalysts (2013)	Shanghai Institute of Ceramics, Chinese Academy of Sciences	China	—
9	Ordered mesoporous metal oxides: synthesis and applications	Fudan University, University of St Andrews	China, United Kingdom	—
10	Mesoporous materials as gas sensors (2013)	University of Paderborn	Germany	—
11	Synthesis of non-siliceous mesoporous oxides (2014)	Max-Planck-Institut für Kohlenforschung	Germany	—

No.	Citing paper	Citing institution(s)	Country	S2
12	Recent advances in ordered meso/macroporous metal oxides for heterogeneous catalysis: a review (2017)	Beijing University of Technology, The University of New South Wales	Australia, China	—
13	Mesoporous TiO_2 single crystals delivering enhanced mobility and optoelectronic device performance (2013)	University of Oxford	United Kingdom	—
14	Ordered mesoporous materials in catalysis (2005)	Max-Planck-Institut für Kohlenforschung	Germany	—
15	Piezoresistive Response of Quasi-One-Dimensional ZnO Nanowires Using an in Situ Electromechanical Device.	Bruker Nano Surfaces, Kiel University, University of California Berkeley	Denmark, Germany, United States	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Contribution 3

Claim — Contribution 3

The researcher pioneered room-temperature synthesis of large-pore bicontinuous mesoporous silica, establishing a foundational methodology for creating complex nanostructured metal oxides with gyroidal symmetry for advanced sensing applications.

The researcher established a foundational contribution in materials science through the 2002 publication 'Room-temperature synthesis in acidic media of large-pore three-dimensional bicontinuous mesoporous silica with Ia3d symmetry.' This core work introduced a novel approach to synthesizing complex mesoporous structures under mild conditions, moving away from traditional high-temperature methods. The titles suggest this work addressed the challenge of creating large-pore, three-dimensional bicontinuous networks with specific Ia3d symmetry, which are critical for applications requiring high surface area and structural stability.

Building on this core innovation, the researcher expanded the scope of these synthesis techniques to broader material classes and applications. The 2004 JACS paper on 'novel mesoporous and mesorelief oxides with gyroidal structures' indicates an extension of the bicontinuous concept to other oxide systems, leveraging the structural principles established in the seminal work. Subsequently, the 2005 publication in Sensors and Actuators B: Chemical applied these hard template methods to 'nanostructured metal oxides' for gas sensing, demonstrating the practical utility of the synthesized architectures in functional devices. This progression from fundamental synthesis to applied sensing highlights the versatility and translational potential of the researcher's methodological framework.

The significance of this line of work is evidenced by substantial citation metrics and broad independent adoption. The core 2002 paper has accumulated 388 citations, while the follow-up studies have garnered 345 and 269 citations respectively, indicating sustained interest and utility in the field. Crucially, analysis of 229 citing papers reveals that 97.8% originate from independent researchers, underscoring that the community widely recognizes and builds upon these contributions outside the researcher's immediate circle. This high degree of independent citation confirms the work's status as a standard reference in the development of mesoporous materials and their applications.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 28

CORE PAPER

Room-temperature synthesis in acidic media of large-pore three-dimensional bicontinuous mesoporous silica with Ia3d symmetry

2002 · 388 citations (GS)

Field-normalised: 234 Semantic Scholar citations place it in the top 5% of Chemistry papers from 2002 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Block copolymer self-assembly directed synthesis of porous materials with ordered bicontinuous structures and their potential applications (2023)	Shanghai Jiao Tong University	China	—
2	Chemistry of Zeolites and Related Porous Materials: Synthesis and Structure (2007)	Jilin University	China	—
3	Mesoporous Carbon Materials: Synthesis and Modification (2008)	Oak Ridge National Laboratory	United States	—
4	MCM-48-like large mesoporous silicas with tailored pore structure: facile synthesis domain in a ternary triblock copolymer– butanol– water system (2005)	Korea Advanced Institute of Science and Technology (KAIST)	South Korea	—
5	Cubic Ia 3 d large mesoporous silica: synthesis and replication to platinum nanowires, carbon nanorods and carbon nanotubes. (2003)	Korea Advanced Institute of Science and Technology (KAIST)	South Korea	—
6	Multifunctional mesoporous silica nanoparticles for biomedical applications (2023)	Beijing Jishuitan Hospital, Beijing University of Chemical Technology	China	—
7	Functional nanomaterials based on block copolymer self-assembly (2010)	Pohang University of Science and Technology (POSTECH)	South Korea	—
8	Mesoporous silica materials: From physico-chemical properties to enhanced dissolution of poorly water-soluble drugs (2017)	Åbo Akademi University, University of Perugia, Zanjan University of Medical Sciences	Finland, Iran, Italy	—
9	Insights into drug loading techniques with mesoporous silica nanoparticles: optimization of operating conditions and assessment of drug stability (2024)	Memorial University of Newfoundland, University of Technology	Canada, Iraq	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

FOLLOW-UP WORK

Nanostructured metal oxides synthesized by hard template method for gas sensing applications

2005 · Sensors and Actuators B: Chemical · 269 citations (GS)

Field-normalised: 175 Semantic Scholar citations place it in the top 5% of Materials Science papers from 2005 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Ordered Mesoporous In_2O_3: Synthesis by Structure Replication and Application as a Methane Gas Sensor (2009)	Justus Liebig University Giessen	Germany	—
2	Porous metal oxides as gas sensors (2007)	Paderborn University, University of Paderborn, University	Germany	—

No.	Citing paper	Citing institution(s)	Country	S2
		of Paderborn (Universität Paderborn)		
3	Ordered mesoporous metal oxides: synthesis and applications	Fudan University, University of St Andrews	China, United Kingdom	—
4	Mesoporous materials and electrochemistry (2013)	CNRS – Université de Lorraine	France	—
5	Mesoporous materials as gas sensors (2013)	University of Paderborn	Germany	—
6	Synthesis of non-siliceous mesoporous oxides (2014)	Max-Planck-Institut für Kohlenforschung	Germany	—
7	Facile fabrication and characterization of two-dimensional bismuth (III) sulfide nanosheets for high-performance photodetector applications under ambient conditions (2018)	Macau University of Science and Technology, Shenzhen University	China, Macao	—
8	PdO/PdO_2 functionalized ZnO:Pd films for lower operating temperature H_2 gas sensing (2018)	Chimie ParisTech, Kiel University	France, Germany	—
9	Defect engineering approaches for metal oxide semiconductor-based chemiresistive gas sensing (2025)	Hanyang University, Indian Institute of Technology Jodhpur, Inha University	France, India, Iran	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

FOLLOW-UP WORK

Facile synthesis and characterization of novel mesoporous and mesorelief oxides with gyroidal structures

2004 · Journal of the American Chemical Society · 345 citations (GS)

Field-normalised: 248 Semantic Scholar citations place it in the top 5% of Materials Science papers from 2004 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Block copolymer self-assembly directed synthesis of porous materials with ordered bicontinuous structures and their potential applications	Shanghai Jiao Tong University	China	—
2	Chemistry of Zeolites and Related Porous Materials: Synthesis and Structure (2007)	Jilin University, Pacific Northwest National Laboratory	China, United States	—
3	Porous metal oxides as gas sensors (2007)	Paderborn University, University of Paderborn, University of Paderborn (Universität Paderborn)	Germany	—
4	MCM-48-like large mesoporous silicas with tailored pore structure: facile synthesis domain in a ternary triblock copolymer– butanol– water system (2005)	Korea Advanced Institute of Science and Technology (KAIST)	South Korea	—
5	On the synergetic catalytic effect in heterogeneous nanocomposite catalysts	Shanghai Institute of Ceramics, Chinese Academy of Sciences	China	—

No.	Citing paper	Citing institution(s)	Country	S2
6	Ordered mesoporous metal oxides: synthesis and applications (2012)	Fudan University, University of St Andrews	China, United Kingdom	—
7	Mesoporous materials as gas sensors (2013)	University of Paderborn	Germany	—
8	Synthesis of non-siliceous mesoporous oxides (2014)	Max-Planck-Institut für Kohlenforschung	Germany	—
9	Recent advances in non-ionic surfactant templated synthesis of porous metal oxide semiconductors for gas sensing applications (2025)	Fudan University, Shanghai Normal University, Tongji University	China	—
10	Ordered mesoporous materials in catalysis (2005)	Max-Planck-Institut für Kohlenforschung	Germany	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
Georgia Institute of Technology	United States	SCImago #270 · THE =41 · QS =123	30
Fudan University	China	SCImago #46 · THE 36 · QS 30	13
Harvard University	United States	SCImago #4 · THE =5 · QS 5	10
Chinese Academy of Sciences	China	SCImago #2	7
Wuhan University of Technology	China	SCImago #405 · QS 951-1000	6
University of California, Los Angeles	United States	SCImago #70 · THE =18 · QS 46	5
Zhejiang University	China	SCImago #6 · THE 39 · QS 49	5
Jilin University	China	SCImago #117 · QS =473	5
Peking University	China	SCImago #11 · THE 13 · QS 14	5
Stanford University	United States	SCImago #18 · THE =5 · QS 3	4
Yonsei University	South Korea	SCImago #238 · THE 86 · QS 50	4
Massachusetts Institute of Technology	United States	SCImago #41 · THE 2 · QS 1	4
University of Science and Technology of China	China	SCImago #77 · THE 51 · QS =132	4
Korea Advanced Institute of Science and Technology (KAIST)	South Korea	SCImago #366 · THE =70	4
Seoul National University	South Korea	SCImago #135 · THE =58 · QS =38	3

Geographic distribution of citing authors

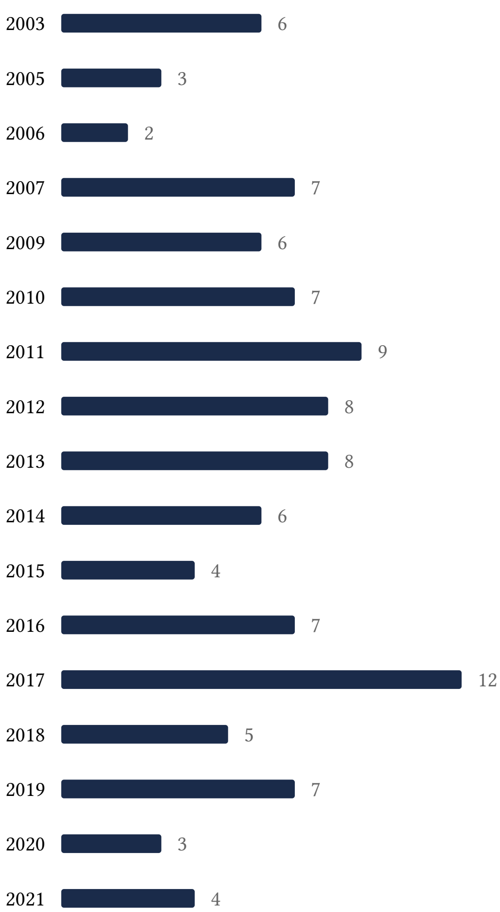
Country	Citing papers
United States	91
China	71

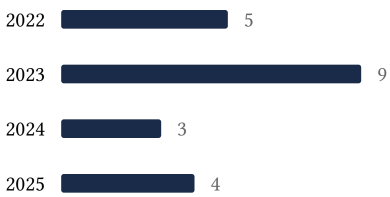
Country	Citing papers
South Korea	25
United Kingdom	10
Germany	9
Australia	8
France	7
Japan	7
Canada	5
India	5
Sweden	5
Switzerland	3

Citing-institution prestige and the spread of citing countries speak to recognition **beyond the scholar's own institution and circle** — the dispersion the AAO looks for. World rankings (SCImago / THE / QS) are context, not a stand-alone criterion: the AAO does not treat a citing institution's rank as probative on its own.

E. Citation Growth Over Time

Distinct citing papers by publication year. Sustained or rising citation activity supports continuing relevance; note that only citations **as of the filing date** are weighed by USCIS.





F. AAO Precedent Considerations

Pre-filing self-check (AAO denial patterns)

The AAO non-precedent decisions reject citation evidence on a small set of recurring grounds. Confirm the petition addresses each before filing:

- ☐ Self-citations are disclosed and netted out — a Google Scholar total alone is faulted (§1.1).
- ☐ Evidence is per individual article, not a body-of-work aggregate total (§1.2).
- ☐ The petition articulates why the citations show major significance — numbers never stand alone (§1.5).
- ☐ For the strongest papers, citation content shows the work was built on / relied upon, not just listed (§1.6, §2.2).
- ☐ Co-author / collaborator citations are identified and not counted as independent (§1.7).
- ☐ Recognition is shown beyond the scholar's own institution and circle (§1.8).
- ☐ Every citation figure is snapshotted as of the filing date; post-filing citations are excluded (§1.9).
- ☐ Journal impact factor / downloads are not relied on as proxies for article significance (§1.10, §1.12).
- ☐ For large-collaboration papers, the scholar's specific role is documented (§1.13).
- ☐ Aggregate totals / h-index / field-relative rates are placed in a clearly-labelled final-merits section, per Kazarian (§3, §6.1.7).

Disclaimer

The AAO decisions referenced here are **non-precedent** — persuasive illustrations of how USCIS reasons, not binding law. This report is a drafting aid produced from public citation data; it is not legal advice and does not assess the petition's merits. All analysis must be reviewed by qualified immigration counsel.

G. Citation Evidence Index

Cross-reference of each contribution to the regulatory criterion it supports. Counsel should map these to the petition's exhibit numbers.

Contribution	Core paper	Indep. cites	Supports
Contribution 1	Coaxial silicon nanowires as solar cells and nanoelectronic power sources	113	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 2	Nonionic Block Copolymer Synthesis of Large-Pore Cubic Mesoporous Single Crystals by Use of Inorganic Salts	26	8 CFR 204.5(h)(3)(v) — Criterion 5

Contribution	Core paper	Indep. cites	Supports
Contribution 3	Room-temperature synthesis in acidic media of large-pore three-dimensional bicontinuous mesoporous silica with Ia3d symmetry	28	8 CFR 204.5(h)(3)(v) — Criterion 5