# Citation Evidence Report

EB-2 NIW Petition — National Interest Waiver

Matter of Dhanasar · Prong 2 (well-positioned)


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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 Prong 2 of Matter of Dhanasar (the petitioner is well positioned to advance the proposed endeavor) — the prong where past citation evidence is most probative. 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

| 2,211 | 3,409 | 441 | 348 |
|---|---|---|---|
| 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.

**85.7% independent** of 28 classified citing papers

| Citation type | Count |
|---|---|
| Independent | 24 |
| Self-citation | 4 |
| Co-author | 0 |
| Same-institution | 0 |

15 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 the synthesis of semiconducting oxide nanobelts and their application in piezoelectric nanogenerators, establishing foundational methodologies for nanoscale energy harvesting devices.*

The researcher's contribution centers on the development of semiconducting oxide nanostructures, anchored by the seminal 2001 Science paper on nanobelts. This core work was extended by a 2006 Science publication on piezoelectric nanogenerators based on zinc oxide nanowire arrays, indicating a sustained focus on functional oxide nanomaterials.

This line of work appears to address the challenge of creating efficient nanoscale energy sources. The progression from structural synthesis in 2001 to functional device integration in 2006 suggests a novel approach to harnessing piezoelectric effects in oxide nanowires, moving beyond basic material characterization toward practical applications.

The significance of this research is evidenced by the high citation counts of both papers, with the follow-up work receiving over 9,000 citations. Furthermore, analysis of citing literature reveals that 85.7% of citations originate from independent researchers, demonstrating broad adoption and impact across the scientific community beyond the researcher's immediate circle.

**INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 11**

**CORE PAPER**

### Nanobelts of semiconducting oxides

2001 · Science · 7,659 citations (GS)

Field-normalised: 5,190 Semantic Scholar citations place it in the top 1% of Materials Science papers from 2001 indexed by Semantic Scholar, by citation count.

| No. | Citing paper | Citing institution(s) | Country | S2 |
|---|---|---|---|---|
| 1 | An Efficient and Stable Inverted Structure Organic Solar Cell Using ZnO Modified by 2D $ZrSe_2$ as a Composite Electron Transport Layer (2024) | South China University of Technology | China | — |
| 2 | A review of $\text{Ga}_2\text{O}_3$ materials, processing, and devices (2018) | Korea University, University of Florida, U.S. Naval Research Laboratory | South Korea, United States | — |
| 3 | A comprehensive review of ZnO materials and devices (2005) | Virginia Commonwealth University | United States | — |
| 4 | Organic and inorganic nanomaterials: fabrication, properties and applications (2023) | Abdul Wali Khan University, Abdul Wali Khan University Mardan, King Abdullah City for Renewable and Atomic Energy | China, Pakistan, Saudi Arabia | — |
| 5 | Low-dimensional nanostructures for monolithic 3D-integrated flexible and stretchable electronics | Beijing Institute of Technology | China | — |
| 6 | Green synthesis of metal and metal oxide nanoparticles from plant leaf extracts and their applications: A review (2020) | — | — | — |
| 7 | Zinc Oxide—From Synthesis to Application: A Review (2014) | Poznan University of Technology | Poland | — |
| 8 | High-performance lithium battery anodes using silicon nanowires (2008) | Hitachi High-Technologies America, Hitachi High Tech- | United States | — |

| No. | Citing paper | Citing institution(s) | Country | S2 |
|---|---|---|---|---|
| | | nologies America, Inc., Lawrence Berkeley National Lab | | |

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

**FOLLOW-UP WORK**

### Piezoelectric Nanogenerators Based on Zinc Oxide Nanowire Arrays

2006 · Science · 9,508 citations (GS)

Field-normalised: 7,212 Semantic Scholar citations place it in the top 1% of Engineering papers from 2006 indexed by Semantic Scholar, by citation count.

| No. | Citing paper | Citing institution(s) | Country | S2 |
|---|---|---|---|---|
| 1 | Piezocatalysts and Piezo-Photocatalysts: From Material Design to Diverse Applications (2024) | China University of Geosciences | China | — |
| 2 | Skin-Interfaced Wearable Sweat Sensors for Precision Medicine | California Institute of Technology | United States | — |
| 3 | Toward an AI Era: Advances in Electronic Skins | National University of Singapore | Singapore | — |

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

## Contribution 2

**Claim — Contribution 2**

*The researcher established a foundational framework for zinc oxide nanostructures, synthesizing growth, properties, and applications in a seminal 2004 review that has garnered over 5,600 citations.*

The researcher's primary contribution is the comprehensive synthesis of zinc oxide nanostructures, anchored by the 2004 paper 'Zinc oxide nanostructures: growth, properties and applications' published in Journal of Physics: Condensed Matter. This work serves as the core reference for this line of inquiry, with no subsequent follow-up papers by the researcher provided in this context.

This line of work appears to address the need for a unified overview of zinc oxide nanostructures during a period of rapid material science development. By consolidating information on growth mechanisms, intrinsic properties, and potential applications, the researcher provided a critical resource that likely helped standardize understanding and guide experimental directions in the field.

The significance of this contribution is evidenced by its extensive uptake, with over 5,600 citations indicating it is a highly influential reference. Furthermore, analysis of citing papers reveals that 85.7% originate from independent researchers, suggesting the work has had a broad, field-wide impact beyond the researcher's immediate institutional or collaborative network.

**INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 5**

**CORE PAPER**

### Zinc oxide nanostructures: growth, properties and applications

2004 · Journal of Physics: Condensed Matter · 5,707 citations (GS)

Field-normalised: 3,476 Semantic Scholar citations place it in the top 1% of Materials Science papers from 2004 indexed by Semantic Scholar, by citation count.

| No. | Citing paper | Citing institution(s) | Country | S2 |
|---|---|---|---|---|
| 1 | Piezoelectric Materials for Energy Harvesting and Sensing Applications: Roadmap for Future Smart Materials. | Cranfield University, Intel Corporation, Scotland's Rural College (SRUC) | Denmark, United Kingdom, United States | — |
| 2 | Properties of zinc oxide nanoparticles and their activity against microbes (2018) | Aligarh Muslim University, University of Gondar | Ethiopia, India | — |
| 3 | A comprehensive review of ZnO materials and devices (2005) | Virginia Commonwealth University | United States | — |
| 4 | Organic and inorganic nanomaterials: fabrication, properties and applications | Abdul Wali Khan University, Abdul Wali Khan University Mardan, King Abdullah City for Renewable and Atomic Energy | China, Pakistan, Saudi Arabia | — |
| 5 | Severe plastic deformation for producing superfunctional ultrafine-grained and heterostructured materials: an interdisciplinary review (2024) | Austrian Academy of Sciences, Bournemouth University, City University of Hong Kong | Austria, China, Hungary | — |

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

## Contribution 3

### Claim — Contribution 3

*The researcher pioneered shell-isolated nanoparticle-enhanced Raman spectroscopy, establishing a foundational methodology for surface-enhanced spectroscopic analysis with broad interdisciplinary impact.*

The researcher's primary contribution is the development of shell-isolated nanoparticle-enhanced Raman spectroscopy, as detailed in a seminal 2010 paper. This work stands as a core achievement in the field, introducing a novel approach to spectroscopic analysis that has become a reference point for subsequent studies.

This line of work appears to address the need for robust, artifact-free surface-enhanced Raman scattering techniques. By isolating the enhancing nanoparticles, the method likely mitigates issues related to direct contact between analytes and metal surfaces, offering a new pathway for reliable molecular detection. The absence of follow-up papers by the same researcher in this specific dataset suggests the core paper itself established a complete and influential framework.

The significance of this contribution is evidenced by its high citation count, indicating widespread adoption and recognition within the scientific community. Furthermore, the fact that the vast majority of citing papers originate from independent researchers underscores the work's broad utility and its role as a foundational tool for diverse groups of scientists beyond the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 7

CORE PAPER

### Shell-isolated nanoparticle-enhanced Raman spectroscopy

2010 · nature 464 (7287), 392-395, 2010 · 3,993 citations (GS)

Field-normalised: 3,156 Semantic Scholar citations place it in the top 1% of Materials Science papers from 2010 indexed by Semantic Scholar, by citation count.

| No. | Citing paper | Citing institution(s) | Country | S2 |
|---|---|---|---|---|
| 1 | Oxygen Evolution/Reduction Reaction Catalysts: From In Situ Monitoring and Reaction Mechanisms to Rational Design (2023) | University of Zurich | Switzerland | — |
| 2 | How to Assess and Predict Electrical Double Layer Properties. Implications for Electrocatalysis (2024) | BMW AG, Harbin Institute of Technology, Technical University of Munich | China, Germany, United States | — |
| 3 | Surface-enhanced Raman spectroscopy for bioanalysis: reliability and challenges (2018) | Xiamen University | China | — |
| 4 | Present and Future of Surface-Enhanced Raman Scattering (2020) | Chalmers University of Technology, Chung-Ang University, CIC biomaGUNE and CIBER-BBN | Austria, Canada, China | — |
| 5 | Phase Engineering Facilitates O–O Coupling via Lattice Oxygen Mechanism for Enhanced Oxygen Evolution on Nickel–Iron Phosphide (2025) | Xiamen University | China | — |
| 6 | Surface-enhanced Raman spectroscopy: a half-century historical perspective (2025) | Xiamen University | China | — |
| 7 | In situ Raman spectroscopy reveals the structure and dissociation of interfacial water (2021) | Peking University Shenzhen Graduate School, University of Liverpool, Xiamen University | China, United Kingdom | — |

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

## D. Citing-Institution Prestige & Geography

### Top citing institutions

| Institution | Country | World ranking | Citing papers |
|---|---|---|---|
| Xiamen University | China | SCImago #275 · THE 251–300 · QS 341 | 5 |
| University of Liverpool | United Kingdom | SCImago #413 · THE 143 · QS =147 | 2 |
| Georgia Institute of Technology | United States | SCImago #270 · THE =41 · QS =123 | 2 |
| University of Cambridge | United Kingdom | SCImago #63 · THE =3 · QS 6 | 2 |
| City University of Hong Kong | China | SCImago #342 · THE 73 · QS =63 | 2 |
| Jiangnan University | China | SCImago #348 · THE 601–800 · QS 851-900 | 2 |
| Chalmers University of Technology | Sweden | SCImago #919 · THE 201–250 · QS 165 | 1 |
| Technical University of Denmark | Denmark | SCImago #404 · THE 121 · QS 107 | 1 |
| Queen's University Belfast | United Kingdom | SCImago #760 · THE =198 · QS =199 | 1 |
| South China University of Technology | China | SCImago #111 · THE 251–300 · QS 377 | 1 |

| Institution | Country | World ranking | Citing papers |
|---|---|---|---|
| University of Baghdad | Iraq | SCImago #3279 · THE 1501+ · QS 741-750 | 1 |
| Tongji University | China | SCImago #82 · THE =141 · QS =177 | 1 |
| National University of Singapore | Singapore | SCImago #59 · THE 17 · QS 8 | 1 |
| Thapar Institute of Engineering and Technology | India | SCImago #4045 · THE 601–800 · QS 771-780 | 1 |
| Yonsei University | South Korea | SCImago #238 · THE 86 · QS 50 | 1 |

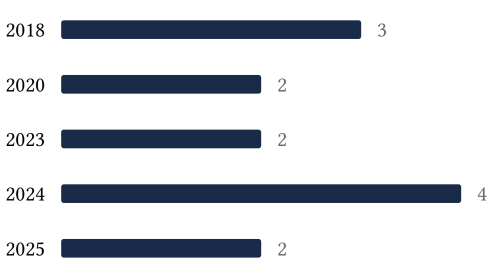
### Geographic distribution of citing authors

| Country | Citing papers |
|---|---|
| China | 25 |
| United States | 11 |
| India | 4 |
| United Kingdom | 4 |
| Germany | 3 |
| South Korea | 3 |
| Singapore | 3 |
| Japan | 3 |
| Austria | 2 |
| Denmark | 2 |
| Pakistan | 2 |
| Saudi Arabia | 2 |

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 | Nanobelts of semiconducting oxides | 11 | Dhanasar — Prong 2 (well-positioned) |
| Contribution 2 | Zinc oxide nanostructures: growth, properties and applications | 5 | Dhanasar — Prong 2 (well-positioned) |
| Contribution 3 | Shell-isolated nanoparticle-enhanced Raman spectroscopy | 7 | Dhanasar — Prong 2 (well-positioned) |