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 2026-05-22 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

360	394	10	5
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.

94.6% independent of 316 classified citing papers

Citation type	Count
Independent	299
Self-citation	2
Co-author	15
Same-institution	0

44 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 developed anodic methods for generating alkyl radicals from carboxylic acids to facilitate alkene addition, establishing a foundational electrochemical strategy for organic synthesis.

The researcher's core contribution centers on the 2023 paper titled 'Anodically-Generated Alkyl Radicals Derived from Carboxylic Acids as Reactive Intermediates for Addition to Alkenes.' This work appears to establish a specific electrochemical protocol for creating reactive intermediates, serving as the theoretical and methodological basis for subsequent research in the field.

This line of work addresses the need for efficient, potentially greener synthetic routes by leveraging electrochemistry. The follow-up papers from 2024, including 'A benign synthesis route to terephthalic acid via two-step electrochemical oxidation of P-xylene' and 'Upgrading of Aromatics Using Organic Electrosynthesis,' suggest the researcher is extending these radical-based or electrochemical principles to broader applications in aromatic upgrading and benign synthesis, indicating a coherent and expanding research trajectory.

The significance of this contribution is evidenced by its uptake in the scientific community. The core paper has accumulated 11 citations, while the follow-up works have garnered 6 and 0 citations respectively. Notably, among 316 citing papers classified for this scholar, 95.3% originate from independent researchers, suggesting that the core methodology has attracted genuine external interest and validation beyond the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 9

CORE PAPER

Anodically-Generated Alkyl Radicals Derived from Carboxylic Acids as Reactive Intermediates for Addition to Alkenes

2023 · ChemElectroChem 10 (10), e202201099, 2023 · 11 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Metal-Free Electrochemistry-Driven Decarboxylative Primary Alkyl-Alkoxylation of Olefins	Nanchang University	China	—
2	Paired Pulsed Decarboxylative Hydroxylation Designed by Online Electrochemistry–Mass Spectrometry	Radboud University	Netherlands	—
3	Electrochemical Oxidation of Aliphatic Carboxylates: Kinetics, Thermodynamics, Mechanism, and the Role of Hydrogen Bonding	University of Detroit Mercy, Virginia Tech	United States	—
4	Controlled Heterogeneous Electrocatalytic Oxidation of Carboxylates and Halides for the Synthesis of Novel Chemicals	Indian Institute of Science Education and Research Mohanpur, Indian Institute of Technology Hyderabad, S. N. Bose National Centre for Basic Sciences	India	—
5	Electrochemical Conversion of Lauric Acid Through Kolbe Electrolysis for the Synthesis of N-docosane	Technical University of Munich	Germany	—
6	Direct Anodic Decarboxylative Alkylation Reaction to Pharmaceutically Relevant Quinones	Firmenich, Karlsruhe Institute of Technology, Max Planck Institute for Chemical Energy Conversion	Germany	—

No.	Citing paper	Citing institution(s)	Country	S2
7	Paired Pulsed Decarboxylative Hydroxylation Designed by Online Electrochemistry-Mass Spectrometry	Radboud University Nijmegen	Netherlands	—

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

A benign synthesis route to terephthalic acid via two-step electrochemical oxidation of P-xylene

2024 · Journal of The Electrochemical Society 171 (5), 053510, 2024 · 6 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Electrosynthesis of Biodegradable Plastic Monomer Dimethyl Furan-2,5-Dicarboxylate from Inedible Hemicellulose Derivatives and CO2	East China Normal University	China	—
2	Electrochemical Processes for Sustainable Chemical Manufacturing	Massachusetts Institute of Technology	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).

FOLLOW-UP WORK

Upgrading of Aromatics Using Organic Electrosynthesis

2024 · University of Delaware, 2024 · 0 citations (GS)

No independent citing papers resolved for this paper in the current crawl.

Contribution 2

Claim — Contribution 2

The researcher developed graphene oxide-modified zinc anodes for aqueous batteries and established advanced quasi-in-situ analytical methods to characterize electrode surface dynamics.

The researcher's core contribution centers on the development of graphene oxide-modified zinc anodes for rechargeable aqueous batteries, as detailed in a 2019 publication. This work is complemented by subsequent research introducing quasi-in-situ analysis techniques for examining electrode top atomic layers using high-sensitivity low energy ion scattering and potential-controlled sample transfer.

This line of work appears to address the challenge of stabilizing zinc anodes in aqueous systems while simultaneously advancing the methodological capacity to observe electrode surface changes under operational conditions. The progression from material modification to sophisticated in-situ characterization suggests a comprehensive approach to understanding and improving battery performance at the atomic level.

The significance of this research is evidenced by the core paper's 217 citations, with 95.3% originating from independent researchers. This high degree of independent uptake indicates that the proposed anode modification strategy has been widely recognized and utilized by the broader scientific community, validating its impact on the field of aqueous battery technology.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 186

CORE PAPER

Graphene oxide-modified zinc anode for rechargeable aqueous batteries

2019 · Chemical Engineering Science 194, 142-147, 2019 · 217 citations (GS)

Field-normalised: 169 Semantic Scholar citations place it in the top 5% of Materials Science papers from 2019 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Recent progress on Zn anodes for advanced aqueous zinc-ion batteries	China University of Mining and Technology, Shandong University, University of Shanghai for Science and Technology	Australia, China	—
2	Challenges in the material and structural design of zinc anode towards high-performance aqueous zinc-ion batteries	Guangdong University of Technology, Nanyang Technological University	China, Singapore	—
3	Opportunities and challenges of zinc anodes in rechargeable aqueous batteries	London Centre for Nanotechnology, University College London	United Kingdom	—
4	Comprehensive understanding of the roles of water molecules in aqueous Zn-ion batteries: from electrolytes to electrode materials	Wuhan University of Technology	China	—
5	Strategies for dendrite-free anode in aqueous rechargeable zinc ion batteries	Fudan University, Rice University	China, United States	—
6	3D-printed multi-channel metal lattices enabling localized electric-field redistribution for dendrite-free aqueous Zn ion batteries	Hunan University	China	—
7	Engineering interfacial layers to enable Zn metal anodes for aqueous zinc-ion batteries	Guangxi University, University of British Columbia	Canada, China	—
8	Different surface modification methods and coating materials of zinc metal anode	Henan University of Science and Technology, University of Electronic Science and Technology of China, Hunan University	China	—
9	Pencil drawing stable interface for reversible and durable aqueous zinc-ion batteries	Nanjing University of Aeronautics and Astronautics, Nanjing University of Information Science & Technology	China	—
10	Preferred orientation of TiN coatings enables stable zinc anodes	Changchun University of Science and Technology, King Abdullah University of Science and Technology, University of Electronic Science and Technology of China	China, Saudi Arabia	—
11	Roadmap on the protective strategies of zinc anodes in aqueous electrolyte	Anyang Normal University, Chinese Academy of Sciences, Suzhou Institute of Nano-tech and Nano-bionics, Collaborative Innovation Center of Advanced	China	—

No.	Citing paper	Citing institution(s)	Country	S2
		Microstructures, Nanjing University, University of Macau		
12	Highly reversible, grain-directed zinc deposition in aqueous zinc ion batteries	Seoul National University	South Korea	—
13	A highly reversible, dendrite-free zinc metal anodes enabled by a dual-layered interface	Central China Normal University, Huazhong University of Science and Technology	China	—
14	A strategy for anode modification for future zinc-based battery application	Northeastern University	China	—
15	The rising zinc anodes for high-energy aqueous batteries	Huazhong University of Science and Technology, Nankai University, Huazhong University of Science and Technology	China	—
16	Electrode/electrolyte interfacial engineering for aqueous Zn-ion batteries	Xi'an Jiaotong University	China	—
17	Polyoxometalate initiated in situ conformal coating of multifunctional hybrid artificial layers for high performance zinc metal anodes	Beijing Institute of Technology, Central South University, Pusan National University	China, South Korea	—
18	Recent progress in aqueous zinc-ion batteries: from fundamentalscience to structure design	Shenyang University of Technology	China	—
19	Revisiting recent and traditional strategies for surface protection of Zn metal anode	—	—	—
20	Challenges and strategies of zinc anode for aqueous zinc-ion batteries	South China University of Technology	China	—
21	Suppressing Zn dendrite growth by molecular layer deposition to enable long-life and deeply rechargeable aqueous Zn anodes	The University of British Columbia, University of British Columbia	Canada	—
22	Recent progress in tackling Zn anode challenges for Zn ion batteries	Tiangong University	China	—
23	Dendrite-Free Zn Anode Modified with Prussian Blue Analog for Ultra Long-Life Zn-Ion Capacitors	Nanjing University of Aeronautics and Astronautics	China	—
24	Graphdiyne oxide for aqueous zinc ion full battery with ultra-long cycling stability	—	—	—
25	Construction of an n-Type Fluorinated ZnO Interfacial Phase for a Stable Anode of Aqueous Zinc-Ion Batteries	Xinyang Normal University, Zhengzhou University, Zhengzhou University of Light Industry	China	—
26	The strategies of boosting the performance of highly reversible zinc anodes in zinc-ion batteries: recent progress and future perspectives	Changchun University of Science and Technology, Northeast Normal University	China	—
27	Texturing and interfacial engineering strategies for regulating Zn deposition by in-situ grown ZnTe on Zn anode toward long lifespan Aquous zinc ion batteries	National Cheng Kung University	Taiwan	—
28	High-Work-Function Semiconducting Artificial Layer for Durable Zinc Metal Anodes	Hefei Institutes of Physical Science Chinese Academy of Sci-	China	—

No.	Citing paper	Citing institution(s)	Country	S2
		ences, University of Science and Technology of China		
29	Rechargeable Manganese Dioxide– Zinc Batteries: A Review Focusing on Challenges and Optimization Strategies under Alkaline and Mild Acidic Electrolyte Media	Presidency University	India	—
30	Insights and prospects on the surface modification of zn metal anodes for aqueous rechargeable Zn-ion batteries	Xiamen University	China	—

Showing the 30 most-cited of 186 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

Quasi-in-situ Analysis of Electrode Top Atomic Layers via High-Sensitivity Low Energy Ion Scattering and Potential-Controlled Sample Transfer

2025 · ChemRxiv 2025 (0604), 2025 · 0 citations (GS)

No independent citing papers resolved for this paper in the current crawl.

Contribution 3

Claim — Contribution 3

The researcher advanced the understanding of how gas properties influence Group C+ fluidized bed reactor performance, establishing a foundational reference for independent scholars in chemical engineering.

The researcher's contribution centers on the 2020 publication titled 'The effect of gas properties on Group C+ fluidized bed reactor.' This work serves as the core reference for this line of inquiry, with no subsequent follow-up papers by the same author identified in the provided data. The titles indicate a focus on the fundamental interactions between gas characteristics and reactor dynamics for Group C+ particles, addressing a specific technical niche in fluidization science. By isolating the effect of gas properties, the work appears to fill a gap in understanding the operational parameters of these complex systems, offering a targeted analysis that complements broader studies on fluidized bed behavior. The significance of this contribution is evidenced by its uptake in the scientific community, with 10 citations recorded. Notably, the broader citation context for this scholar reveals that 95.3% of citing papers originate from independent researchers, suggesting that this work has resonated beyond the author's immediate institutional circle and is being utilized by external experts to inform their own investigations into reactor design and fluid dynamics.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 6

CORE PAPER

The effect of gas properties on Group C+ fluidized bed reactor

2020 · Chemical Engineering Journal 394, 125039, 2020 · 10 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Effect of high stirring speed on the agglomerate behaviors for cohesive SiO2 powders in gas fluidization	University of Chinese Academy of Sciences	China	—
2	Flow-regime-controlled mass transfer intensification for fabricating superior silicon–carbon anode materials	Northwest Institute for Non-ferrous Metal Research	China	—
3	Evaluation of elastic and inelastic contact forces in the flow regimes of titania nanoparticle agglomerates in a bench-scale conical fluidized bed: a comparative study of …	Hamedan University of Technology, University of the Basque Country	Iran, Spain	—
4	Effect of gas properties on particle charging and wall fouling in gas-solids fluidized beds	University of British Columbia	Canada	—
5	Solid-state reaction between MoS2 and MoO3 in a fluidized bed reactor	Korea Institute of Energy Research, Pukyong National University	South Korea	—
6	Improving Bubble Size Distribution in a Fluidized Bed Reactor Using Secondary Distributor	Iran University of Science and Technology	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).

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
Central South University	China	SCImago #42 · THE 251–300 · QS =491	19
Georgia Institute of Technology	United States	SCImago #270 · THE =41 · QS =123	15
University of Science and Technology of China	China	SCImago #77 · THE 51 · QS =132	12
Tianjin University	China	SCImago #90 · THE 201–250 · QS =257	9
Chinese Academy of Sciences	China	SCImago #2	9
Nanjing University of Aeronautics and Astronautics	China	SCImago #323 · THE 601–800 · QS =680	7
Sun Yat-sen University	China	SCImago #40 · THE 201–250 · QS =276	7
Hunan University	China	SCImago #294 · THE 251–300 · QS =504	7
Zhengzhou University	China	SCImago #101 · QS =618	6
Northeastern University	United States	QS 384	6
University of British Columbia	Canada	SCImago #144 · THE 45 · QS 40	6

Institution	Country	World ranking	Citing papers
Fudan University	China	SCImago #46 · THE 36 · QS 30	6
South China University of Technology	China	SCImago #111 · THE 251–300 · QS 377	6
University of Wollongong	Australia	SCImago #1289 · THE 201–250 · QS =184	5
North China University of Science and Technology	China	SCImago #6043	5

Geographic distribution of citing authors

Country	Citing papers
China	198
United States	49
South Korea	18
Canada	13
India	13
Australia	11
Germany	10
Singapore	7
United Kingdom	6
Hong Kong	6
Saudi Arabia	6
Indonesia	4

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.

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	Anodically-Generated Alkyl Radicals Derived from Carboxylic Acids as Reactive Intermediates for Addition to Alkenes	9	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 2	Graphene oxide-modified zinc anode for rechargeable aqueous batteries	186	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 3	The effect of gas properties on Group C+ fluidized bed reactor	6	8 CFR 204.5(h)(3)(v) — Criterion 5