

How Should Journals Address a Procedure That Turns out to Be Dangerous?

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How Should Journals Address a Procedure That Turns out to Be Dangerous?

Oriyeda Trashi, Neha Satish, Thien-Quang Nicholas Nguyen, Jeremiah J. Gassensmith,¹ and Mary Beth Mulcahy,^{2*}

Cite This: ACS Chem. Health Saf. 2024, 31, 228–237

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ABSTRACT: This Commentary critically evaluates scientific journals' responsibility in addressing safety concerns within chemical research publications. We highlight the risks associated with uncritically accepting initial safety claims in the chemical literature, especially when such claims are later retracted or corrected. Our analysis focuses on three specific cases where procedures initially deemed safe necessitated significant safety corrections, and we emphasize the inadequate response of the publishing community to these updates. It is important to note that safety corrections often remain less visible and less cited than the original flawed publications. We scrutinize the mechanisms publishers employ for marking safety-related corrections and retractions and find them inconsistent and insufficiently visible to alert researchers, particularly trainees and those with less experience. We propose more effective strategies to enhance the clarity and prominence of safety information, including mandatory peer-review by chemical safety specialists and prominent watermarking of papers with safety corrections. We also advocate for authors and reviewers to use a safety checklist that includes detailed hazard identification, clear storage and handling instructions, and justification of hazardous reagents. Our Commentary underscores the shared responsibility across the scientific ecosystem in maintaining safety standards, advocating for a proactive role by journal publishers in protecting researchers from hazardous procedures and compounds, thus prioritizing safety in the publication of chemical research.

KEYWORDS: safety information, hazard identification, publications, corrections, retraction

INTRODUCTION

When the authors of a published paper assure the reader that a typically unstable class of compounds can be made safely and stored without special precautions, it is apt to get attention and readership, particularly from laboratory trainees. One such incident recently happened in a University of Texas at Dallas research team where a graduate student was preparing a class transfer reagent from a report promising a shelf-stable formulation,¹ however, a suspicious color change during solvent removal by rotary evaporation prompted the graduate student to return to the paper online when they then noticed a correction² had been published that addressed safety concerns. After reading the additional information, the student correctly placed the reaction in a fume hood and contacted the university's environmental safety and health (ESH) professionals.

In other circumstances, safety concerns related to a published procedure are revealed after an incident occurs. Almost 12 years after their work's original publication date, Macikenas et al.³ learned from a C&EN Letter to the Editor⁴ that a researcher had been injured in an explosion after using a modified version of their published procedure. For other authors, safety issues are raised by peers who reach out and express concerns about various aspects of their publication.⁵

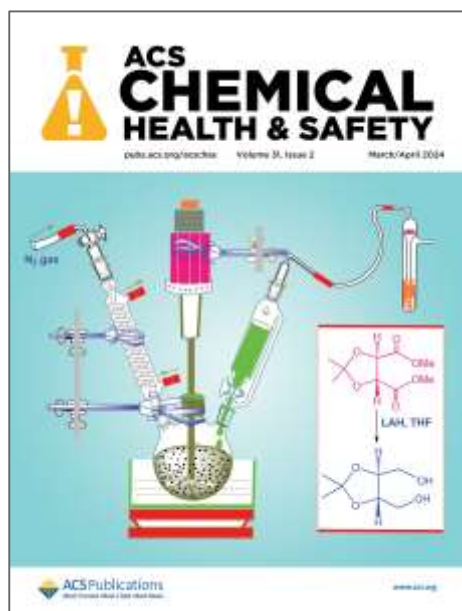
Both graduate students and established researchers must find trusted partners to support safe research continually, but who are these trusted sources? Safety professionals, of course, and hopefully fellow researchers, but what about the literature? Should this be trusted? We argue that this trust may sometimes be misplaced. Three publications discussed in this paper (refs 1, 5, and 12) demonstrate moments where the literature erroneously presented procedures as safe (Figure 1), only for those comments to be walked back by the authors through published notices of correction (refs 6, 7, and 8, respectively). Yet, the original papers, not the notices with safety concerns, are more regularly cited.

Through the analysis presented in this paper, we make the case that when the authors provide a safety commentary through a journal's "correction" mechanism, the publishing community

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About the Journal



Audience: Scientists with broad research backgrounds (e.g. chemists, human factors, toxicology, occupational health), chemical engineers, environmental safety and health professionals, industrial hygienists, public health professionals, safety policy makers, graduate students, and more.

Scope: While safety permeates all ACS journals, it benefits from its preeminence in ACS CHAS. Chemical safety research can be transformational and innovative, and it can also focus on practice and be narrowly scoped. This includes foundational datasets or variations on well-studied themes because they hold value to those working with hazardous materials. ACS Chemical Health & Safety provides the opportunity to publish across all these areas.

Topics & Impact

Machine Learning and Deep Learning in Chemical Health and Safety: A Systematic Review of Techniques and Applications

Zeren Jiao, Pingfan Hu, Hongfei Xu, and Qingsheng Wang*

Cite this: *ACS Chem. Health Saf.* 2020, 27, 6, 316–334

Publication Date: October 18, 2020

<https://doi.org/10.1021/acs.chas.0c00075>

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Safe Synthesis of MAX and MXene: Guidelines to Reduce Risk During Synthesis

Christopher E. Shuck, Kimberly Ventura-Martinez, Adam Goad, Simge Uzun, Mikhail Shekhirev, and Yury Gogotsi*

Cite this: *ACS Chem. Health Saf.* 2021, 28, 5, 326–338

Publication Date: August 18, 2021

<https://doi.org/10.1021/acs.chas.1c00051>

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- Other (occupational safety, regulatory, emergency response, training/education, etc.)

“ I'd like to pitch something to @JOC_DL . Put corrections that involve safety warnings on the downloadable PDF. You really can't warn people enough. Let's take this nice but "corrected" paper. Who wouldn't want an "intrinsically safe" diazo-transfer reagent?

The problem is that this compound turns out to be explosive as a solid and the authors have corrected that [...]

The compound clearly isn't "intrinsically safe" and considering it explodes the downloadable PDF should be marked.

Again, here's another "stable" and non-explodey diazotranfer reagent: (spoiler: it also explodes as a solid)

Again, a correction—the title compound explodes. [...] and again, the PDF doesn't mention it.

Here's my pitch—Yes, the website shows a correction, though it doesn't specify that it is safety related. If the consequence of not seeing that correction is blowing a few fingers off then that notice needs to be plastered everywhere *including and especially* the downloaded PDF

”



Three articles in ACS journals that published follow-up safety corrections.

*** ADDITION / CORRECTION** This article has been corrected. [View the notice.](#)

An Efficient, Inexpensive, and Shelf-Stable Diazotransfer Reagent: Imidazole-1-sulfonyl Azide Hydrochloride

Ethan D. Goddard-Borger and Robert V. Stick

[View Author Information](#) ▾

Cite this: *Org. Lett.* 2007, 9, 19, 3797–3800
Publication Date: August 22, 2007 ▾
<https://doi.org/10.1021/ol701581g>
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*** ADDITION / CORRECTION** This article has been corrected. [View the notice.](#)

Intrinsically Safe and Shelf-Stable Diazo-Transfer Reagent for Fast Synthesis of Diazo Compounds

Shibo Xie, Ziqiang Yan, Yuanheng Li, Qun Song, and Mingming Ma*

Cite this: *J. Org. Chem.* 2018, 83, 18, 10916–10921
Publication Date: August 18, 2018 ▾
<https://doi.org/10.1021/acs.joc.8b01587>
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Copper-Catalyzed Azide–Alkyne Cycloaddition of Hydrazoic Acid Formed *In Situ* from Sodium Azide Affords 4-Monosubstituted-1,2,3-Triazoles

Dominik Jankovič, Miha Virant, and Martin Gazvoda*

Cite this: *J. Org. Chem.* 2022, 87, 6, 4018–4028
Publication Date: February 11, 2022 ▾
<https://doi.org/10.1021/acs.joc.1c02775>
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Year	Journal/ Correction Prompt	Correction Abstract
2011	Journal of the American Chemical Society/Accident ²	It has come to our attention that during an attempted synthesis of compound 4 (2-(tert-butylsulfonyl)iodosylbenzene) described in this Communication, an explosion occurred that injured a laboratory worker,..
2022	Nature Materials/ Missing Safety Statement	Safety considerations. Although all the reactions were carried out at ambient temperature, mixtures of CH ₄ and O ₂ can be explosive. Therefore, all glassware and apparatus should be pressure proof with full appropriate containment and protective screening.”
2018	ACS Omega/ Typo	Since this dimanganese heptoxide (Mn ₂ O ₇) is very unstable and explosive in nature, the reaction temperature was maintained below 5 °C [original paper stated 55 °C] during the addition of 6 g of KMnO ₄ .
1985	Journal of Organic Chemistry/ Post Publication Correspondence	We wish to call particular attention to potential hazards in the use of tetrakis(acetonitrile) copper(I) perchlorate. Although we have had no explosion with this material, we have become aware of very serious accidents with other metal perchlorate acetonitrile adducts.
2014	Organic Letters/ Post Publication Data Reveals Safety Concerns	We have discovered a safety problem with the protocol for preparing (±)-7-azabicyclo[4,2,0]oct-3-en-8-one (1) as described in the Supporting Information....Recent efforts in our laboratories have revealed that this protocol carries a risk of dangerous pressure buildup in the reaction vessel.

ACS

Wiley

JOC Article
 Unpaired Heteroatom of Electrophilic Alkenes by Tetrahydrothiophene as the Precursor of Vinylidene Sulfonates
 Yuh-8. Yuhara,¹ Toshiaki K. Kuroki,¹ Yuki K. Okada,¹ Yui Nakano,¹ Tomoki S. Kuroki,¹ and Naoki S. Zettsu¹
 Graduate School of Science, Department of Chemistry, Graduate School of Science, Osaka University, 1-1, Honcho, Suita, Osaka 565-0871, Japan
 Received 10/10/2022; Accepted 11/10/2022; Published Online 11/10/2022

ABSTRACT
 The reaction of tetrahydrothiophene (THF) with electrophilic alkenes in the presence of a sulfonamide salt afforded a vinylidene sulfonate in good yield. The reaction proceeds via a sulfonamide salt intermediate, which is formed by the reaction of THF with the sulfonamide salt. The reaction is highly regioselective and yields a wide range of vinylidene sulfonates in good to high yields. The yield and regioselectivity of the reaction are dependent on the structure of the sulfonamide salt.

JOC Article
 Intrinsically Safe and Shelf-Stable Diazo-Transfer Reagent for Fast Synthesis of Diazo Compounds
 Shihua Bai,¹ Jinyang Yao,¹ Yuesheng Li,¹ Qing Wang,¹ and Shengping Mo¹
 State Key Laboratory of Synthetical Chemistry, Institute of Chemistry, Chinese Academy of Sciences, Beijing 100190, China
 Received 10/10/2022; Accepted 11/10/2022; Published Online 11/10/2022

ABSTRACT
 A novel diazo-transfer reagent was developed for the synthesis of diazo compounds. The reagent is intrinsically safe and shelf-stable, and it can be used for the synthesis of diazo compounds in a wide range of substrates. The reaction is highly regioselective and yields diazo compounds in good to high yields. The yield and regioselectivity of the reaction are dependent on the structure of the substrate.

RSC Advances
 PAPER
 Down-regulation of MIR523 inhibits (PS-induced) proliferation and invasion via regulation of the NF- κ B signaling pathway in osteosarcoma cells
 A. Qian et al.
 Received 10/10/2022; Accepted 11/10/2022; Published Online 11/10/2022

ABSTRACT
 MicroRNAs (miRNAs) are small non-coding RNA molecules that play a significant role in the regulation of gene expression. miRNAs have been shown to be involved in the regulation of cell proliferation and invasion. In this study, we investigated the role of miR-523 in osteosarcoma cells. We found that miR-523 expression is upregulated in osteosarcoma cells and that its overexpression promotes cell proliferation and invasion. miR-523 targets the NF- κ B signaling pathway, and its down-regulation inhibits proliferation and invasion via regulation of the NF- κ B signaling pathway.

Journal
 Title: Lower lipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim
 ABSTRACT
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Broadband and pixelated camouflage in inflating chiral nematic liquid crystalline elastomers
 Se-Um Kim, Young-Joo Lee, Jiaqi Liu, Daw Seok Kim, Haihan Wang, and Shu Yang^{1*}
 Nature Materials 21, 41–46 (2022) | [Cite this article](#)
 11k Accesses | 81 Citations | 43 Altmetric | [Metrics](#)
 An Author Correction to this article was published on 27 September 2021
 This article has been updated

Fast and long-range triplet exciton diffusion in metal-organic frameworks for photon upconversion at ultralow excitation power
 Prasenjit Mahato, Angelo Mangano, Nobuhiko Yamai, Teppai Yamada, and Nobuo Kimizuka^{1*}
 Nature Materials 19, 924–930 (2020) | [Cite this article](#)
 10k Accesses | 100 Citations | 28 Altmetric | [Metrics](#)
 A Correction to this article was published on 20 December 2016
 This article has been updated

nature materials LETTERS
 Broadband and pixelated camouflage in inflating chiral nematic liquid crystalline elastomers
 Se-Um Kim¹, Young-Joo Lee¹, Jiaqi Liu¹, Daw Seok Kim¹, Haihan Wang¹ and Shu Yang^{1*}
 Published online: 11 August 2022 | DOI: 10.1038/s41565-022-01000-0

Retracted nature materials ARTICLES
 Fast and long-range triplet exciton diffusion in metal-organic frameworks for photon upconversion at ultralow excitation power
 Prasenjit Mahato¹, Angelo Mangano¹, Nobuhiko Yamai^{1,2*}, Teppai Yamada^{1,2} and Nobuo Kimizuka^{1,4*}
 Published online: 1 August 2016 | DOI: 10.1038/nmat4514

ADDITION / CORRECTION This article has been corrected. View the notice.

An Efficient, Inexpensive, and Shelf-Stable Diazotransfer Reagent: Imidazole-1-sulfonyl Azide Hydrochloride

Ethan D. Goddard-Borger and Robert V. Stick

View Author Information

Cite this: *Org. Lett.* 2007, 9, 19, 3797–3800

Publication Date: August 22, 2007

<https://doi.org/10.1021/ol701581g>

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Correction to Intrinsically Safe and Shelf-Stable Diazo-Transfer Reagent for Fast Synthesis of Diazo Compounds

Tetrahydrofuran-based two-step solvent liquefaction process for production of lignocellulosic sugars †

Check for updates

Apa Chooch, Martin R. Hevly, Jake S. Lindstrom, Patrick A. Johnson, and Robert C. Brown

Reaction Chemistry & Engineering



PAPER

Check for updates

Tetrahydrofuran-based two-step solvent liquefaction process for production of lignocellulosic sugars †

Apa Chooch, Martin R. Hevly, Jake S. Lindstrom, Patrick A. Johnson, and Robert C. Brown

High-yield production of fermentable and chemical feedstocks from lignocellulosic biomass and rapid identification of waste streams are key challenges facing the production of a novel two-step liquefaction process for producing fermentable sugars from cellulosic waste. A mixture of tetrahydrofuran (THF) and 2-butanol and 10% acetic acid enabled establishment of higher performance in biomass achieving 22% sugar conversion and 24% solid recovery in a 100% pretreatment step. The pretreatment alters the structure of biomass through delignification and produces a cellulose-rich biomass which is readily liquefied at low temperature giving 65% total sugar yields in a subsequent liquefaction process employing the same solvent system. This process achieves comparable sugar yields at high solidities previously compared to conventional pretreatment methods. THF, which can be derived from renewable resources, may avoid benefits as a solvent including ease of recovery from the liquid stream providing low energy and cost.

B)

Updates are available
Correction dated 2020-09-12
Click to view correction:
<https://doi.org/10.1039/D0CY00025J>

Tetrahydrofuran-based two-step solvent liquefaction process for production of lignocellulosic sugars
Crossref DOI link: <https://doi.org/10.1039/D0CY00025J>
Published Online: 2020
Update policy: <https://www.rsc.org/10.1039/d0cy00025j/c1>

D)

Document is current
Any future updates will be listed below

Tetrahydrofuran-based two-step solvent liquefaction process for production of lignocellulosic sugars
Crossref DOI link: <https://doi.org/10.1039/D0CY00025J>
Published Online: 2020
Update policy: <https://www.rsc.org/10.1039/d0cy00025j/c1>

Intrinsically safe and shelf-stable diazo-transfer reagent for fast synthesis of diazo compounds

S Xie, Z Yan, Y Li, Q Song, M Ma - The Journal of organic chemistry, 2018 - ACS Publications

We report a crystalline compound 2-azido-4, 6-dimethoxy-1, 3, 5-triazine (ADT) as an intrinsically safe, highly efficient, and shelf-stable diazo-transfer reagent. Because the decomposition of ADT is an endothermic process ($\Delta H = 30.3 \text{ kJ mol}^{-1}$), ADT is intrinsically nonexplosive, as proved by thermal, friction, and impact tests. The diazo-transfer reaction based on ADT gives diazo compounds in excellent yields within several minutes at room temperature. ADT is very stable upon > 1 year storage under air at room temperature.

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Search Methodologies

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3. explosive
4. caution
5. injur*
6. shock
7. sensitive
8. intrinsically
9. overpressure
10. incident
11. accident
12. incident
13. alert*
14. danger
15. mistake

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Method 1

~6,700 contained safety words or correction words → **5 safety**

Method 2

~1,000 matches → **12 safety**

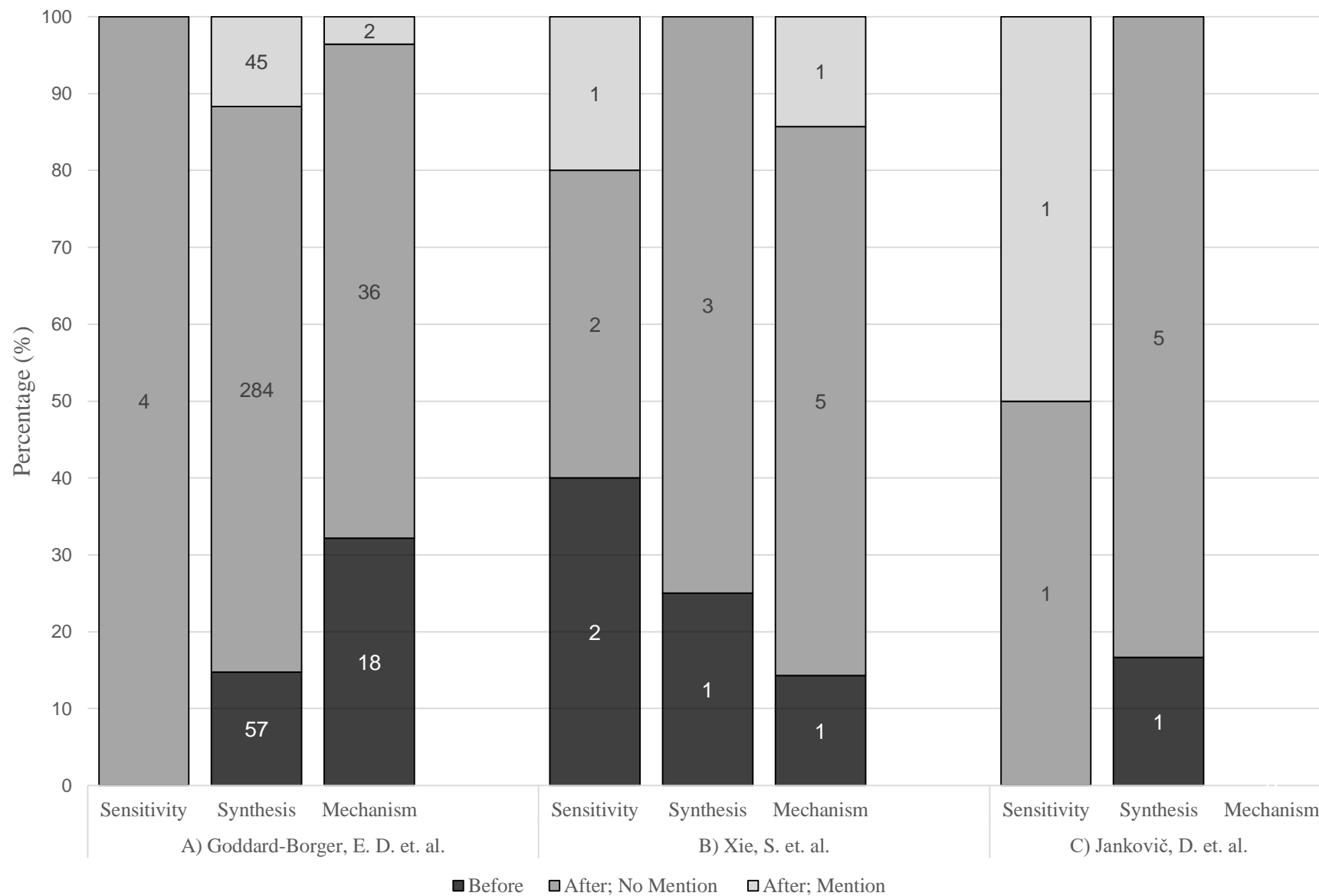
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Method 3

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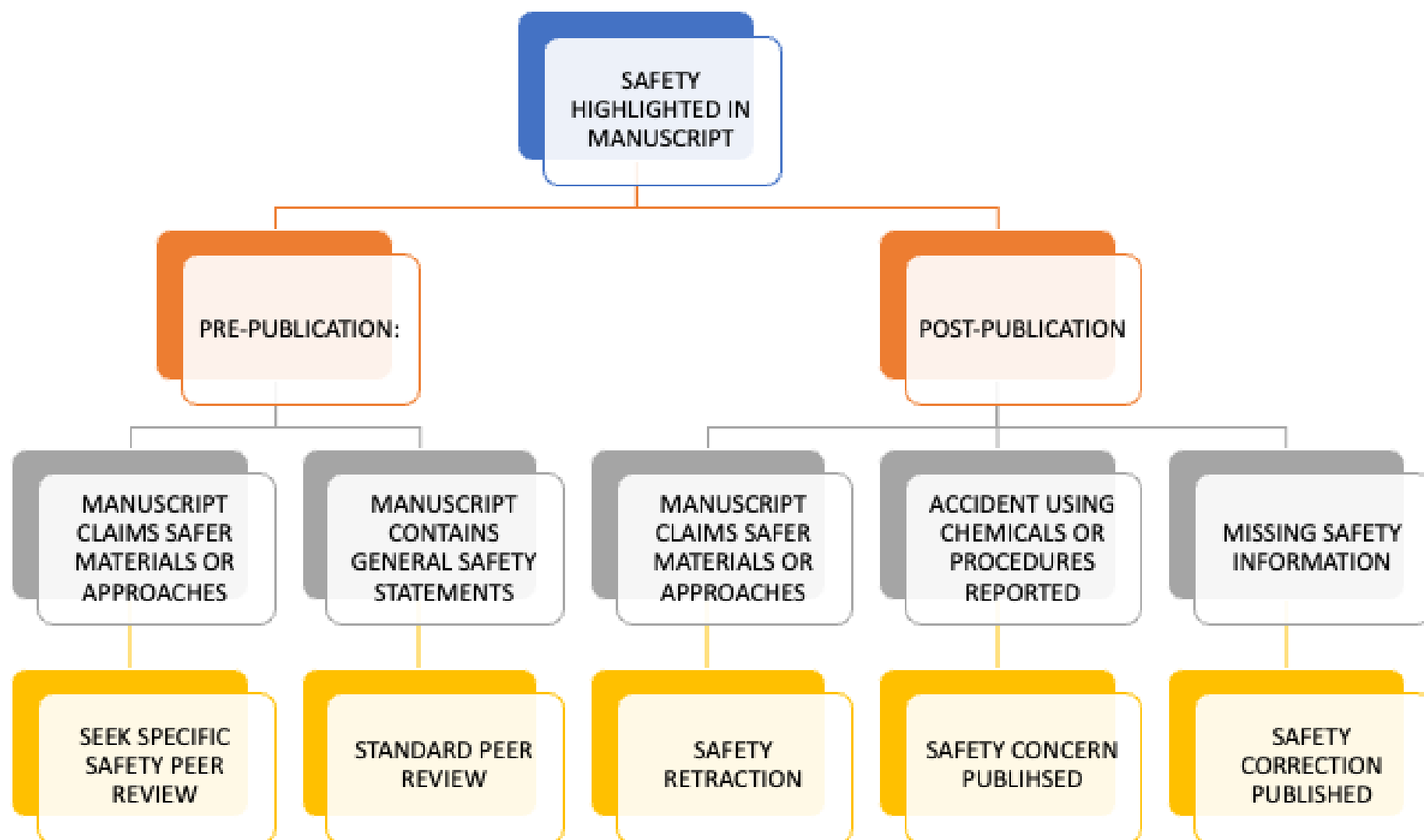
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Safety Checklist for Reviewers and Authors

- Have authors identified hazards of intermediates, including data to support the claims?
- Are storage conditions for intermediates and products described?
- Have authors documented the maximum scale-up that has been safely performed?
- Is there safe disposal advice for the compounds prepared in the work?
- Has the data that informs the safe handling of compounds such as shock sensitivity, temperature sensitivity, moisture sensitivity, and flammability been included in the main body of the text or as supporting information?
- Do the authors give information about any observed degradation of an intermediate, even if the degradation product is not known?
- Are justifications for using reagents known to be very hazardous provided?

Safety pre- and post-publication





Questions