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Editorial: Women in environmental chemistry

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Editorial on the Research Topic
Women in environmental chemistry

Following the commemoration of International Women's Day and the UNESCO International Day of Women and Girls in Science (established in 2015), Frontiers in Environmental Chemistry takes pride in providing a platform to showcase the endeavours of women scientists across all domains of Environmental Chemistry. Presently, women constitute less than 30% of researchers worldwide. An examination of over two million papers in the life sciences reveals a significant gender bias in citations: research led by female authors tends to receive fewer citations compared to papers led by male authors, especially in subsequent papers led by males. This trend persists across various subfields of the life sciences, even in those with relatively balanced gender representation (Zhou et al., 2024). Throughout history, persistent gender biases have resulted in a notable gender gap in scientific roles, hindering the visibility and recognition of female researchers compared to their male counterparts. Consequently, the scarcity of female scientific role models has been limiting. However, with cultural advancements and concerted efforts by female scientists to challenge gender stereotypes, the gender gap is gradually narrowing.

So, initiatives that highlight the role of women and girls in science should be nurtured. For instance, since 2019, the International Union of Pure and Applied Chemistry (IUPAC, 2024) has initiated the Global Women's Breakfast, an event commemorating the achievements of women in science. It aims to inspire younger generations to pursue careers in STEM fields (https://iupac.org/gwb/). The occasion of a dedicated Research Topic in Frontiers in Environmental Chemistry presents a chance to advocate for the complete and equitable involvement of women and girls in science, including the relevant field of environmental chemistry Figure 1. Environmental chemistry holds an extensive potential to permeate and correlate numerous facets of our society. Its prevalent influence would render it essential in resolving the multifaceted challenges outlined by the 17 United Nations Sustainable Development Goals (SDGs) (targeting issues that include water, energy, climate, oceans, urbanization, transport, science, and technology) and its corresponding targets. In this frame, despite growing recognition of the indispensable role that women play in advancing sustainability, the present scenario remains characterized by imbalance, inconsistency, and inequity.

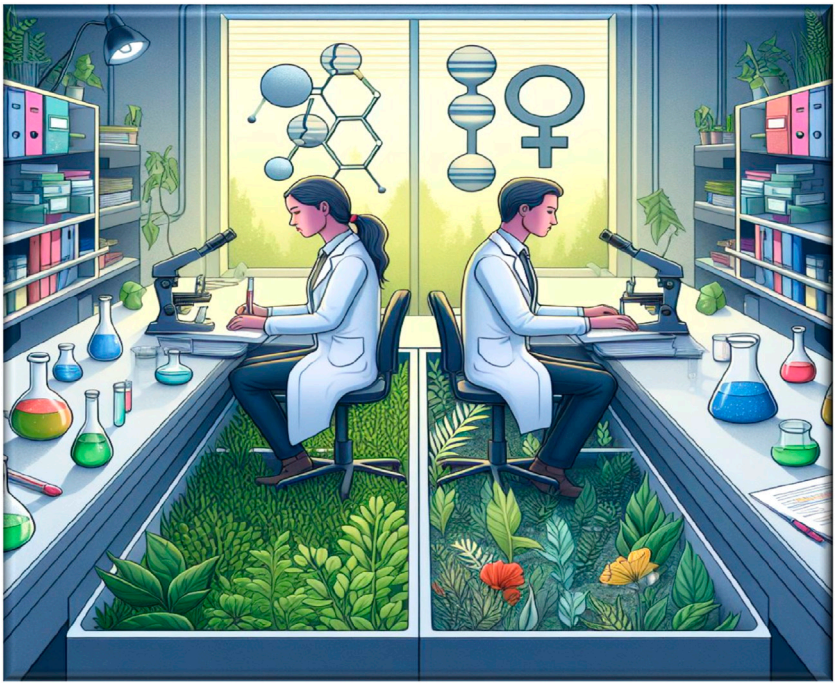

FIGURE 1
Researchers in environmental chemistry.

Women tend to demonstrate more sustainable consumption patterns in comparison to men. Consequently, their carbon footprint is smaller, resulting in a reduced overall environmental impact (OECD, 2008). It is evident that Sustainable Development Goal 5 (SDG 5—Gender Equality) stands as pivotal, as its attainment is integral to the realization of all other goals. Failure to achieve gender equality could significantly impede progress across various areas. Gender inequity is widely acknowledged as a significant obstacle to sustainable development. In pursuit of fostering peace, safeguarding our planet, and eradicating poverty by 2030, we advocate for systemic change facilitated by the holistic and inclusive approach of women in green and environmental chemistry and engineering. The attainment of sustainability goals hinges upon fully recognizing, acknowledging, strengthening, and significantly amplifying the role of women in sustainable chemistry and engineering. They serve as key agents driving this systemic change (Medupin, 2020).

To change traditional mindsets, gender equality must be promoted, stereotypes defeated, and girls and women should be encouraged to pursue STEM careers. In pursuit of fostering change, Frontiers journals aspired to promote gender equality through dedicated special issues. Undoubtedly, female researchers have made remarkable contributions to the diverse research field, and this Research Topic is devoted to environmental chemistry. To be considered for this Research Topic, the first or last author was a researcher who identified as a woman. Five great articles were accepted, after the peer review process, for this Research Topic and key information is added in further discussion to provide an overview of all five research papers.

In a research paper by Cai et al., layered MoS_2 was successfully grown on TiO_2 {001} surface to develop the 2D MoS_2/TiO_2 {001} composites which was employed for photocatalytic production of H_2 from H_2S. The density functional theory (DFT) calculations and X-ray photoelectron spectroscopy (XPS) analysis revealed electron transport at the MoS_2/TiO_2 interface. Further, it was claimed that MoS_2 loading significantly reduced the band gap while widening the light absorbance into the visible light region. When compared to pure TiO_2, the photocatalytic activity of developed composites for H_2 evolution was significantly enhanced. This study may offer a facile way to design 2D photocatalysts with great efficiency for H_2S treatment.

In another research paper by Xu et al., amino-thiol bifunctional polysilsesquioxane/carbon nanotubes (PSQ/CNTs) based magnetic composites were tailored by sol-gel method. A thorough examination was conducted on the adsorption properties of composites utilized as effective adsorbents for removing Hg (II) from aqueous solutions. The optimal pH for Hg (II) removal by bifunctional composites was reported to be 4.5. Regenerated composites showed up to 78% removal of Hg (II) even after three cycles of repetition. This study indicated that PSQ/CNTs composites can be efficiently utilized to remove trace concentration Hg (II) from wastewater.

Further, Oumarou Amadou et al. developed the environmentally friendly hydrometallurgical method for selective dissolution of Co from WC-Co-based wastes consisting of 20 wt% of Co binder in the mixture. In this study, biodegradable organic acids (OAs) such as acetic, citric, maleic, lactic, succinic, lactobionic, and itaconic acids, were investigated for selective cobalt leaching.

For strontium (Sr) isotope analysis, Crowley et al. compared powdered enamel sample pretreatment techniques. In their study, 14 pretreatment methods were used, comprising ashing, soaking in water an oxidizing agent or acetic acid, and a combination of these steps. Three proboscideans' molar enamel aliquots were produced

and examined. The strontium isotope ratios ($^{87}Sr/^{86}Sr$), Sr and uranium concentrations were measured for each pretreatment. It was determined that even minute variations in $^{87}Sr/^{86}Sr$ could have a significant impact on data interpretations particularly in areas with low isotopic variability.

Martínez-Álvarez et al., examined the sorption of benzo(a)pyrene (B(a)P), as a model polycyclic aromatic hydrocarbons (PAHs), on polystyrene MPs having different sizes 4.5 and 0.5 μm. Huge surface area and hydrophobic nature of MPs usually supports for sorption of PAHs pollutants. In this study PAHs removal study from the water accommodated fraction (WAF) of a naphthenic North Sea crude oil was also conducted using MPs with 4.5 μm size. Results indicated that the maximal sorption capacity for B(a)P was higher in 0.5 μm MPs compared to 4.5 μm MPs.

As guest editors, we extend our heartfelt gratitude to our female contributors for their outstanding dedication, and we appreciate the constructive efforts of our reviewers. Special thanks are due to the editorial staff for their brilliant idea and invaluable assistance throughout the editing process. Lastly, we aim for this issue to convey a clear message to every young female student in environmental chemical sciences: persevere and chase your dreams in the fascinating realm of environmental chemical research.

Author contributions

EB: Writing–original draft, Writing–review and editing. CA: Writing–original draft, Writing–review and editing. CF: Writing–original draft, Writing–review and editing. VS: Writing–original draft, Writing–review and editing.

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The figure, representing a woman and a man researchers in Environmental Chemistry, was generated by IA.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The author(s) declared that they were an editorial board member of Frontiers, at the time of submission. This had no impact on the peer review process and the final decision.

Publisher's note

References

IUPAC (2024). International union of pure and applied chemistry. https://iupac.org/gwb/.

Medupin, C. (2020). Women in environmental sciences (WiES) and the UN SDGs: a catalyst for achieving a sustainable future for all. *Sustainability* 12, 7116. doi:10.3390/su12177116

OECD (2008). *Gender and Sustainable Development: Maximising the Economic, Social and Environmental Role of Women*. Paris: OECD Publishing. doi:10.1787/9789264049901-en

Zhou, S., Chai, S., and Freeman, R. B. (2024). Gender homophily: in-group citation preferences and the gender disadvantage. *Res. Policy* 53, 104895. doi:10.1016/j.respol.2023.104895