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EDITED AND REVIEWED BY
Chuangang Hu,
Beijing University of Chemical Technology, China

*CORRESPONDENCE
Giulia Masi,
giulia.masi5@unibo.it
Tadeja Kosec,
tadeja.kosec@zag.si
Ilaria Cacciotti,
ilaria.cacciotti@unicusano.it
Patricia Krawczak,
patricia.krawczak@imt-nord-europe.fr

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Editorial: Women in science: materials 2023

Giulia Masi[1]*, Tadeja Kosec[2]*, Ilaria Cacciotti[3]* and Patricia Krawczak[4]*

[1]Department of Civil, Chemical, Environmental, and Materials Engineering, University of Bologna, Bologna, Italy, [2]Laboratory for Metals, Corrosion and Anti-Corrosion Protection, Slovenian National Building and Civil Engineering Institute, Ljubljana, Slovenia, [3]Engineering Department, University Niccolò Cusano, Rome, Italy, [4]Centre for Materials and Processes, IMT Nord Europe, Institut Mines-Télécom, Univ. Lille, Douai, France

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Editorial on the Research Topic
Women in science: materials 2023

According to the fact sheet on the gender gap in science published by UNESCO's Institute for Statistics (UIS) in February 2024 (UIS - UNESCO Institute for Statistics, 2024), women still account for a minority of the world's researchers: overall, approximately one in three researchers are women. Taking into account all the data gathered by the UIS since 1996, representing 147 countries reporting on female researchers or research and development personnel in headcounts or full-time equivalents, the percentage of women researchers globally is 31.7% in 2021.

Despite the growing demand for cross-nationally comparable statistics on women in STEM (science, technology, engineering, and mathematics), national data and their use in policymaking often remain limited. Over the past decade (2012–2021), 130 countries reported the share of women researchers in national science, technology and innovation systems. The shares of female researchers for 2021 by region are:

- 31.7% for World (↗ up from 30.9% in 2011).
- 49.6% for Central Asia (↗ up from 44.7% in 2011).
- 44.4% for Latin America and the Caribbean (≈ slightly lower than 44.9% in 2011).
- 41.1% for Arab States (↗ up from 37.7% in 2011).
- 38.7% for Central and Eastern Europe (↘ down from 40.5% in 2011).
- 33.9% in Western Europe (↗ up from 31.8% in 2011).
- 31.5% for Sub-Saharan Africa (↗ up from 29.1% in 2011).
- 26.8% for East Asia and the Pacific (↗ up from 21.1% in 2011).
- 25.9% in South and West Asia (≈ stable compared to 25.7% in 2011).
- No regional value for North America (Canada and the United States do not report internationally comparable data on share of female researchers).

These trends in regional and global averages, which should be considered as estimates, show that the evolution is slow, and that the scattering between regions remains high, the shares varying from single to double for example between the lowest (25.9%) and the highest (49.6%) observed values.

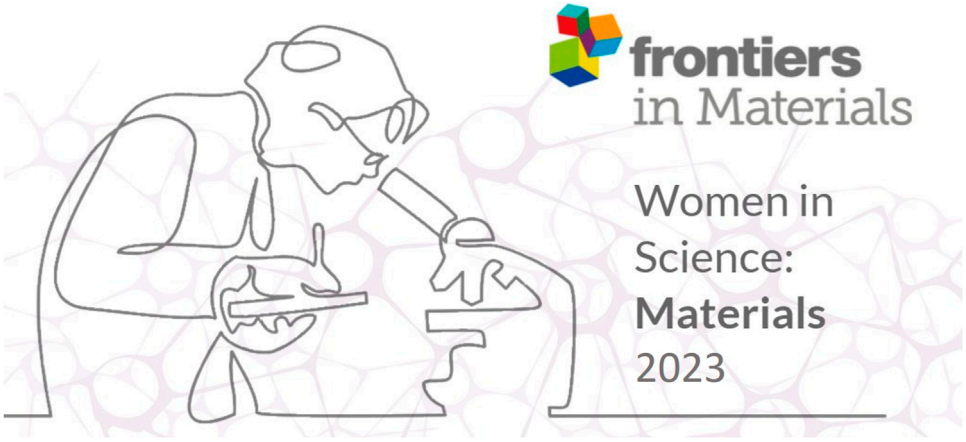

FIGURE 1
"Women in Science: Materials 2023" article Research Topic in Frontiers in Materials.

As role models are important to show to younger generations the growing impact of female researchers to science, and continuing the spirit of the International Day of Women and Girls in Science, Frontiers in Materials has decided to offer a platform to bring into the spotlight, highlight the impact, and promote the contributions and research outcomes of female scientists from different parts of the world working in materials science and engineering.

Following the first two editions (Bignozzi et al., 2021; Krawczak et al., 2023), this 3rd volume of the "Women in Science: Materials" article Research Topic (Figure 1) gathers a selection of original articles with the lead author and/or corresponding author being a woman.

Nine contributions (one perspective, one review and seven original research articles) present advances in theory, experiment, and methodology with applications to compelling problems, across different sections of the journal:

- Biomaterials and Bio-Inspired Materials: In a perspective paper, Danti and Berrettini have highlighted to what extent getting to nano can open new horizons for piezoelectric material-based cochlear implants. By combining nanostructured non-biodegradable biomaterials and an efficient surgical implantation based on tissue engineering approach, the envisioned piezoelectric device could be optimized in terms of reduced electric output and improved level of sensitivity. Foti et al. have proposed an innovative methodology for the effective removal of cetyltrimethylammonium bromide (CTAB), surfactant commonly used in the synthesis of gold nanorods (AuNR). The reported approach is based on a combination of ligand replacement and surface bioconjugation processes that efficiently removes CTAB and simultaneously functionalizes nanorods with hyaluronic acid (HA) to enhance their biocompatibility and introduce targeting capabilities toward cancer cells. Mellinas et al. have formulated and produced novel antioxidant/antifungal active films as promising alternatives to the traditional petrol-derived systems at the industrial scale. The developed films, produced by means of melt-blending followed by compression-moulding, are based on bio-polyethylene (BPE) added with Nutrabiol® T90 and Tocobiol® Plus natural extracts rich in tocopherols at different concentrations (1 and 3 wt%). The obtained films have been fully characterised in terms of barrier, mechanical, optical and functional properties.
- Environmental Degradation of Materials: Lors et al. have reviewed the progress made in the field of biodegradability of bio-based plastics based on polylactic acid (PLA). In particular, the main biodegradation mechanisms have been reviewed according to aerobic and anaerobic conditions, as well as the different microorganisms involved in the PLA degradation. Additionally, the analytical methods used to evaluate the PLA biodegradation have also been illustrated.
- Polymeric and Composite Materials: Yilmaz Attay and Bilgiç have developed new radar absorbing materials made of carbon nanotubes reinforced polymer composites to reduce the reflection of electromagnetic waves. In response to the issue of natural resource shortages in building and construction, Zambon and Deléglise-Lagardère have explored the potential for material valorization of shredded glass fiber/unsaturated polyester composites waste in mortar and concrete as a substitute to sand. Kayishaer et al. have investigated the electrodeposition of polyaniline films with an original focus on the modulation of the conductivity, capacitance and electroactivity of the films using surfactants of different polarity.
- Mechanics of Materials: Franzoni and Pizzigatti have investigated the performance of different repair mortars in terms of efficacy, compatibility and durability of an historic reinforced concrete floor slab in the context of 20th century architectural heritage conservation.
- Structural Materials: Hägg Mameng et al. have developed a practical tool consisting on building pitting engineering diagrams for stainless steel, considering several fundamental parameters, i.e. alloying composition of stainless steel, chloride ion, temperature, and the water system's oxidation potential. This practical tool enables reliable stainless steel selection in

presence of chloride-containing media at different temperatures and concentrations.

The Guest Editorial team hopes that this Research Topic has highlighted the diversity of research being performed by women researchers working in materials science and engineering. The Guest editorial team also hopes for inspiring future collaborations involving more female principal investigators.

Author contributions

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