Editorial

Foreword to the special issue arising from the international conference *TUR2025*

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This special volume of "Journal of Geosciences" contains papers arising from topics presented at the 4th International Conference on Tourmaline (*TUR2025*), held from July 14 to 18, 2025, in Antsirabe, Madagascar.

Madagascar is renowned for its mineral wealth and diversity, especially those related to granitic pegmatites in central Madagascar. The series of international conferences on tourmaline commenced during the 2017 follow-up of the famous 1997 conference held in Nové Město na Moravě, Czech Republic. The idea that tourmaline specialists should meet regularly every four years and share their discoveries ignited effort and enthusiasm that culminated in the 3rd International Conference on Tourmaline (https://www.tur2021.com/) on Elba Island, Italy.

TUR2025 took place in central Madagascar, which was logistically challenging for both organizers (Ferdinando Bosi and Federico Pezzotta) and participants of the meeting. The conference was therefore held in a hybrid (in-person + online) format, making the talks globally accessible. The conference brought together 55 participants from 14 countries (Fig. 1) and stimulated new cooperations in studies of tourmaline and other boron minerals. These contributions are summarized in the book of abstracts (available for download at: https://stella.uniba.sk/texty/PRIF_BPB_TUR_2025_abstracts.pdf and https://tur2025.com/).

Conference field trips took participants to some of the well-known localities of central Sahatany Valley (Tsarafara, Ampatsikahitra/Ambavalosa, Tamponilapa Ambany, Tamponilapa Ambony, Manjaka/Sahananana) as well as the famous Anjanabonoina pegmatites. The field-trip guidebook was prepared by the team led by Milan Novák (Masaryk University) and Federico Pezzotta.

The special issue in your hands contains remarkable papers ranging from theoretical crystallography, through experimental mineralogy and gem spectroscopy, to petrology of tourmaline in pegmatites and morphological and textural analysis of tourmaline corrosion.

The paper "Position of Ti in the tourmaline structure based on bond-valence topological modelling" by *Peter Bačík* and *Lenka Skřápková* provides a detailed theoretical analysis of possible mechanisms of titanium entrance in tourmaline structure. Titanium, so far found in stoichiometric amounts only in two tourmaline species (dutrowite and magnesio-dutrowite), is a common minor to trace element, especially in ferromagnesian tourmalines. The study shows that structural constraints limit Ti entrance to the tourmaline structure.

Spectroscopic and experimental study with the title "From multicolored to Paraiba: the role of Mn in heat-induced color change in Cu-bearing tourmalines" is presented by *Riccardo Luppi and co-authors*. This study demonstrates that the color of Cu-bearing tourmalines is governed by the combination, concentration, and oxidation state of Cu, Mn, Fe, and Ti, as well as by post-crystallization redox processes. It highlights the importance of tourmaline color as a petrogenetic recorder of subtle physicochemical changes in its crystallization environment. These findings provide critical insights into pegmatitic evolution, the role of natural irradiation in gemstone coloration, and the gemological distinction between natural and treated Paraiba-type tourmalines.

In the third paper, *Ivo Macek and co-authors* present a petrological study on the formation of late fibrous tourmaline from granitic pegmatites enclosed in compositionally contrasting Mg- and Ca,Mg-rich rocks; they demonstrate the essential role of externally derived low-T aqueous fluids on its formation. Fibrous tourmalines have complex textures and composition, controlled chiefly by crystal-structural constraints and rate of crystallization. Late fibrous to acicular tourmalines may serve as valuable indicators of the fluid composition.

Two papers focused on tourmaline corrosion phenomena are presented by *Paul Rustemeyer,* who demonstrates their complexity on the example of black tourmaline from the Skardu Area in North Pakistan, examining both outer

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morphology and inner textural diversity. These features are commonly seen at many localities; their systematic assessment presented here provides a solid basis for their future experimental and petrological research.

We would like to thank the Editorial Board of the Journal of Geosciences and the Chief Editor, *Vladislav Rapprich,* for making this issue possible. We thank all referees for their careful work and devotion to helping papers published in this special issue to achieve the highest quality.

Finally, we are pleased to announce that the next international meeting, *TUR2029*, will be held in Slovakia in 2029; please stay tuned for further updates.

Jan Cempírek, Ferdinando Bosi, Peter Bačík
[Guest Editors]



Fig. 1 In-person participants of the *TUR2025* conference, Antsirabe, Madagascar (*photo by F. Pezzotta*)