

# “MIST-ICAL ZEOLITES: JOURNEYING THROUGH HUMID HORIZONS”

*Ines Topalović Piteša, mag. ing. cheming., MBA  
Altium International d.o.o.  
ines.topalovic@alphachrom.hr*

In our daily lives, humidity has an impact on everything, from our comfort levels to environmental quality. Knowing and harnessing the abilities of zeolites, natural and synthetic minerals with exceptional adsorption properties, helps us to address and overcome challenges posed by humidity. This lecture, titled "Mist-ical Zeolites: Journeying Through Humid Horizons", will show connection between humidity, zeolites, and their applications in everyday life. But it will also give an overview of the techniques used for zeolite analysis, with the focus on humid atmospheres, where solutions like STA (simultaneous DSC and TGA) play important role.

Humid atmospheres studies are important for zeolite research for several reasons:

- **Adsorption Properties:** Zeolites are known for their high adsorption capacity which can be influenced by the presence of moisture in the atmosphere. Analysis of zeolite behavior under humid conditions helps us to understand how moisture affects their adsorption properties, which is crucial for applications such as gas separation, water purification, and humidity control.
- **Catalytic Activity:** Many zeolite-based catalysts are used in reactions where water is present, such as hydrocarbon and biomass conversion. Humidity can affect their catalytic activity and selectivity by influencing the surface chemistry and diffusion of reactants and products. Understanding these effects is essential for optimizing catalytic processes in humid environments.
- **Structural Stability:** Exposure of zeolites to humid atmospheres can lead to structural changes which can affect their performance. Studying the stability of zeolite structures under different humidity conditions is important for ensuring their long-term durability and reliability.
- **Water Sorption and Desorption:** Zeolites are often used for dehumidification, air conditioning and other similar applications. Understanding the kinetics and thermodynamics of water sorption and desorption in zeolites under varying humidity conditions is essential for designing efficient and energy-saving systems.
- **Environmental Applications:** Zeolites can be used for pollutant removal from the environment. Humidity can affect their adsorption efficiency, as well as their regeneration process. Studying zeolite behavior under humid conditions helps optimize their performance for environmental remediation applications.

Overall, studying zeolite behavior under humid atmospheres provides valuable insights into their adsorption properties, catalytic activity, structural stability, water sorption behavior, and environmental applications, contributing to the development of more efficient and versatile zeolite-based materials and technologies.