

Einladung

Im Rahmen der gemeinsamen Kolloquien der Fakultät für Chemie und Chemische Biologie der Technischen Universität Dortmund hält

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einen Vortrag mit dem Thema:

Hybrid organic-inorganic thermomaterials towards the energy transition.

In the current energy transition scenario, refrigeration sector accounts for around 20% of the electric consumption in the world, while the global heating demand consumes 50% of the total energy production. Furthermore, both combined sectors are responsible for over 50% of the global carbon emissions. For that reason, the international regulations are phasing out the use of the principal refrigeration and heating gases commonly used in vapour compression systems and heat pumps, while the alternative are still limited. Under these pressing circumstances, the scientific community is working towards the development of new thermomaterials that are more efficient, eco-friendly and safe for the users. [1]

In the last years, hybrid organic-inorganic materials –including coordination polymers and metal-organic frameworks– with solid-solid phase transitions have exhibited thermal properties of great interest for thermal management applications, giving rise to the emerging families of barocaloric and breathing-caloric hybrid materials. Here, barocaloric materials are those compounds that exhibit very large thermal changes (adiabatic temperature changes and/or isothermal entropy changes) related to solid-solid phase transitions. Meanwhile, the thermal changes in breathing-caloric compounds arise from the combination of solid-solid breathing-like transitions and gas-sorption processes. [1]

This discussion summarizes the recent efforts of the scientific community and of our research group towards the discovery and development of hybrid materials with barocaloric and breathing-caloric effects, from hybrid organic-inorganic perovskites[2] to ionic plastic crystals[3] and metal-organic frameworks.[4]

References:

- [1] Barocaloric Effects in the Solid State: Materials and methods, IOP Publishing, 2023.
- [2] J.M. Bermúdez-García *et al.*, *Nat. Commun.*, 2017, 8, 15715.
- [3] J. García-Ben *et al.*, *J. Mater. Chem. A.*, 2024, 12, 23751.
- [4] M. Gelpi *et al.*, *Adv. Mater.* 2024, 36, 2310499.

Zeit: Mittwoch, 09.04.2025 um 16.15 Uhr
Ort: C/HS 3, Chemiegebäude, Campus Nord

Für die Dozent*innen der Chemie

Im Auftrag des Dekans

Betreuer: Prof. Dr. Sebastian Henke (3976)