

Ortsverband Freiberg
Die Vorsitzende / Prof. Dr. Carla Vogt
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GDCh-Kolloquium am 10.12.2025

TU Bergakademie Freiberg, Lessingstraße 45

16:15 Uhr, Lessingstr. 45, LES-1001



Dr. H. Samet Varol

Università degli Studi di Milano Statale, Italy

Advancing Materials by Using Functional Polymers – in Bulk, on Surfaces, or at Nanopores

Functional polymers drive stimuli-responsive behavior across nanocomposites, (super)hydrophobic coatings, and especially in recent decades, solid-state nanoporous membranes. In my talk, I will first link molecular-scale filler–polymer interactions and chain alignment to nanocomposite mechanics, and then show how polysiloxane micro/nanopatterning renders time-dependent (super)hydrophobicity on the coated surfaces. In the solid-state nanoporous membrane section of my talk, I will first discuss how mesoporous silica films, upon functionalization with pH-responsive polymers, can enable gradual, simultaneous control of anion and cation nanopore transport via Ca^{2+} ion binding at nanopores. Then, I will explain how we electropolymerized polydopamine within insulating silica nanopores and used this functionalization to control ionic nanopore transport. I will then introduce my ongoing *Alexander von Humboldt (AvH)* research activities in Italy, focusing on polymeric ion-track-etched membranes and on time-dependent ionic and fluorescent cargo transport in their nanochannels. In particular, I will present how ionic analytes can diffuse through differently charged nanochannels at micromolar concentrations where analyte–wall interactions vary. Most recently, we also upgraded the nanochannel chemistry via bio-based chitosan functionalization, providing coupled steric hindrance and tunable charge selectivity to regulate ion flux at the nanochannels. I will close my talk with an outlook on future activities for my AvH project and on possible collaborations with TU Bergakademie Freiberg.

Interessenten sind herzlich willkommen!

Prof. Dr. C. Vogt
Ortsverbandsvorsitzende

Prof. Dr. G. Frisch
Fakultätsdekan



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