



Preface

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This Special Issue of the *Zeitschrift für Physikalische Chemie* entitled “*From Nanostructure to Function*” is based on a selection of lectures presented at the 6th Erwin Schrödinger Symposium 2023 and the 4th European Conference on Physical Chemistry – ECPC23. Both conferences were co-organized at the Vorarlberg University of Applied Sciences, Dornbirn, Vorarlberg, Austria, from 9–11 October 2023, by the Erwin Schrödinger Society for Nanosciences and the Division of Physical Chemistry of the European Chemical Society (EuChemS) in a series of successful predecessor events held in Austria, Italy, France, and Germany.

The aim of this conference was to stimulate vivid scientific communication and discussion in synthetic, biogenetic, and biomimetic interfacial nanosciences in relation to their fabrication methods, characterization properties, size effects, applications, and modelling of features and structures. The conference contributions revealed a new, material-related perspective on the “nano” dimension, with the focus shifting from analysis to function.

Six selected articles are published in this Special Issue, highlighting present progress in physical chemistry and related interdisciplinary fields of research:

Temporally-shaped femtosecond laser pulses are shown to be advantageous for writing grooves on glass surfaces followed by mechanical cutting. This approach can be exploited for precise dicing of dielectrics and semiconductors.¹

Surface investigations by modern techniques in spectroscopy and microscopy of bronze and brass patinas covering sculptures that are exposed to environmental degradation are reported. These results are the key for developing innovative conservation strategies for cultural heritage.²

The mechanisms leading to electrochemical generation of ferrate ions are investigated by dual dynamic voltammetry. The optimum electrochemical conditions for ferrate ion formation were determined that will facilitate to find optimum conditions in large scale industrial processes.³

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Drug delivery probed by label-free stimulated Raman spectromicroscopy provides insights into drug-induced molecular responses of oral mucosa tumor cells with high sensitivity and spatial resolution. These results can be of importance for the evaluation of novel therapeutic strategies.⁴

The biopolymers chitin and keratin are in the focus of a comprehensive review covering their hierarchical functional structures as well as promising high-value applications. This review covers important aspects such as biomimetics, waste management, and chemical properties of these biopolymers.⁵

Protein aggregation is an outstandingly important topic that is influenced by multiple parameters. Specifically, atomistic molecular dynamics simulations are used to investigate the influence of glycine on the formation of fibrils of the model protein β -lactoglobulin.⁶

It seems worth to remark that the proposed articles share a common point of view, consisting in the idea that specific and “concrete” advanced experimental techniques applied to very specific problems are the basis to build the further advancement of science. In other word, fundamental and applied research walk on the very same pathway.

We may conclude the preface to this special issue with a slight touch of self-irony, quoting Pliny the Younger (61–113 AD): “Nullus est liber tam malus ut non aliqua parte prosit” (“There is no book so bad that it is not profitable on some part”).

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