Received: 5 December 2022 | Accepted: 6 December 2022

DOI: 10.1002/pen.26218

EDITORIAL

spe INSPIRING PLASTICS PROFESSIONALS POLYMER ENGINEERING AND SCIENCE WILEY

Editorial: In honor of Gregory B. McKenna's contributions to the field of polymer science

The present collection of articles gives an impressive overview of diverse aspects in the field of polymer physics to which Dr. Gregory B. McKenna (Figure 1) contributed enormously with his work. The articles range from fundamental research to studies of applied materials. The applications discussed are as different as future engineering technologies and medicine. Before giving an synopsis of the issue, first, we briefly review Dr. McKenna's background and accomplishments.

FIGURE 1 Dr. McKenna inspecting a piece of amber

Gregory B. McKenna attended the U.S. Air Force Academy from which he received his Bachelor's degree in Engineering Mechanics in 1970. As part of his active duty, he attended MIT where he earned a Masters Degree in the area of composite materials before being stationed at Hill Air Force Base in Ogden Utah, where he served as a Test Evaluation Engineer until 1975 when he left the Air Force at the rank of Captain. While in Utah, he also obtained a Ph.D. in Materials Science and Engineering at the University of Utah, graduating in 1976. Dr. McKenna was honored with a National Research Council Postdoc at the then National Bureau of Standards (NBS) and accepted a permanent position at NBS (now the National Institute of Standards and Technology, NIST) in 1977. He was the head of the Structure and Mechanics Group in the Polymers Division at NIST from August 1992 until July 1999 when he moved to Texas Tech University as Professor in the Department of Chemical Engineering and John R. Bradford Endowed Chair in Engineering. In 2005, he became a Paul Whitfield Horn Distinguished Professor at TTU. In 2021, he moved to the Department of Chemical and Biomolecular Engineering at North Carolina State University. Dr. McKenna has earned a reputation as a pioneering researcher in multiple areas of polymers and materials physics and engineering, including physics of glasses, solid mechanics and nonlinear viscoelasticity of polymers, thermodynamics and mechanics of elastomers and gels, and molecular rheology. He has over 260 publications that have been cited over 20,000 times. Dr. McKenna is a Fellow of the American Physical Society, the Society of Plastics Engineers, the Society of Engineering Science, the North American Thermal Analysis Society (NATAS), The American Institute of Chemical Engineers, the American Association for the Advancement of Science (AAAS), and the Society of Rheology. He is the recipient of multiple awards including the International Award from the Society of Plastics Engineers, the Mettler-Toledo Award of NATAS, and the Bingham Medal of the Society of Rheology. He has served as Chairman of the Polymer Physics Division of the APS, President of the Society of Engineering Science, and President of the Society of Rheology.

In this special issue, Dr. McKenna himself contributes a trendsetting article[1] which presents three current directions in polymer physics: the question of the divergence of relaxation time at a finite temperature (in which amber plays a key role), dynamic heterogeneity, and the dynamics of circular macromolecules. While there is

The virtual issue **In Honor of Greg McKenna** can be found at this URL.: https://onlinelibrary.wiley.com/doi/toc/10.1002/(ISSN)1548-2634.In-Honor-of-Greg-McKenna

[Correction added on 5 April 2023, after first online publication: References have been updated and the details about Journal Title, Year of publication, Volume and First page number were added into the references].

evidence of a clear answer for the first question and there is significant progress concerning the second, for the last topic, many unanswered questions remain. In another article by Lopez et al.,[2] mixing rules for the glass transition temperatures are scrutinized. As well as having an immediate relevance for the estimation of T_g of blends, this study allows an insight on the origin of T_g from the theoretical concept of configurational entropy. The work of Song et al.[3] indicates a relaxation process different from α and β relaxation responsible for deep-glass aging, but some care may have to be taken due to concerns raised in ref. [4].

Other articles in this volume, although not being explicitly fundamental studies, include very fundamental and general concepts as the mathematically elegant description of weak gels formed by cartilage components by fractional calculus in the article by Ferenc Horkay and Jack Douglas[5] or the application of the Ozawa-Avrami model for the crystallization kinetics of materials for additive manufacturing by Alexis Thézé et al.[6] Finally, Bernard Lotz[7] makes a strong point for the fundamental relevance of *crystalline* polymers, a sometimes-neglected topic in polymer physics.

The question of unifying ion conductivity and stability in membranes and how to solve it by an aligned microstructure is tackled by Pitia et al.[8] Methods to produce microfibers for battery application by means of polymer precursors are presented by Gabriel Gonzalez et al.[9] Polymers with high intrinsic microporosity for gas-separation membranes are studied by a combination of dynamical methods by Kolmangadi et al.[10] Yucheng Wang et al.[11] use a similar technique as used in ref. [7] for surface decoration here as a preparative tool to obtain highly oriented crystalline polymer layers. Materials of less technological but more cross-disciplinary relevance, namely ambers, are studied by Kong et al.[12] with respect to their polymeric network structure.

There are several articles dealing with the development and improvement of experimental technologies. An important contribution to rheological metrology is the random-frequency sweep method described by Montgomery Shaw.[13] A recurring novel theme is flash DSC which is used to study otherwise inaccessible phenomena as a glassy polymer layer at a nanoparticle surface (Sakib et al.[14]) or possible below-T_g features (Pallaka et al.[4]). Some studies, as those of Jin et al.[15] and Pallaka et al.[4] also address with diligence possible mistakes and artifacts in current experimental procedures contributing to the improvement of future such studies.

Most of the authors of this volume are close collaborators of Greg McKenna. Speaking for myself, Greg strongly influenced the way I am "doing science." I presume this is true also for many of the scientists presenting their work here. So apart from the direct contribution by his scientific studies and publications also Greg's contribution through collaborations, mentorship, and friendship must not be underestimated. I think I can speak for all the authors here in thanking Greg for this very personal contribution.

Reiner Zorn

Forschungszentrum Jülich GmbH, Jülich Centre for Neutron Science (JCNS-1) and Institute for Biological Information Processing (IBI-8), Jülich, Germany

Correspondence
Reiner Zorn, Forschungszentrum Jülich GmbH, Jülich Centre for Neutron Science (JCNS-1) and Institute for Biological Information Processing (IBI-8), 52425 Jülich, Germany.
Email: r.zorn@fz-juelich.de

ORCID

Reiner Zorn https://orcid.org/0000-0001-7321-8404

REFERENCES

[1] G. B. McKenna, D. Chen, S. C. H. Mangalara, D. Kong, S. Banik, *Polym. Eng. Sci.* **2022**, *62*, 1325.
[2] E. Lopez, Y. P. Koh, J. A. Zapata-Hincapie, S. L. Simon, *Polym. Eng. Sci.* **2022**, *62*, 2435.
[3] H. Song, G. A. Medvedev, J. M. Caruthers, *Polym. Eng. Sci.* **2022**, *62*, 537.
[4] M. R. Pallaka, R. Bari, S. L. Simon, *Polym. Eng. Sci.* **2022**, *62*, 3059.
[5] F. Horkay, J. F. Douglas, *Polym. Eng. Sci.* **2022**, *62*, 349.
[6] A. Thézé, A. Guinault, G. Régnier, S. Richard, B. Macquaire, *Polym. Eng. Sci.* **2022**, *62*, 336.
[7] B. Lotz, *Polym. Eng. Sci.* **2022**, *62*, 304.
[8] E. Pitia, S. Batra, M. Cakmak, M. Shaw, R. A. Weiss, *Polym. Eng. Sci.* **2022**, *62*, 319.
[9] G. Gonzalez, M. T. Hasan, D. Ramirez, J. Parsons, M. Alcoutlabi, *Polym. Eng. Sci.* **2022**, *62*, 360.
[10] M. A. Kolmangadi, P. Szymoniak, R. Zorn, M. Böhning, M. Wolf, M. Zamponi, A. Schönhals, *Polym. Eng. Sci.* **2022**, *62*, 2143.
[11] Y. Wang, J. X. Liu, K. Gu, A. Soman, T. Gu, C. B. Arnold, R. A. Register, Y.-L. Loo, R. D. Priestley, *Polym. Eng. Sci.* **2022**, *62*, 841.
[12] D. Kong, Y. Meng, G. B. McKenna, *Polym. Eng. Sci.* **2022**, *62*, 1023.
[13] M. T. Shaw, *Polym. Eng. Sci.* **2022**, *62*, 309.
[14] N. Sakib, Y. P. Koh, S. L. Simon, *Polym. Eng. Sci.* **2022**, *62*, 2977.
[15] S. Jin, G. B. McKenna, *Polym. Eng. Sci.* **2022**, *62*, 1124.