IUPAC- Polymer Division IV

Subcommittee on Structure and Properties of Commercial Polymers

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CHAIR : Yongfeng Men
Western European Chair: Iakovos Vittorias
Eastern Asian Chair: Koh-hei Nitta

SECRETARY: Yujing Tang
Dietmar Auhl
Kenji Urayama

IUPAC
INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

INTRODUCTION

The aim of the Subcommittee is to operate an international network of scientists whose interests lie within the broad field of **structure and properties** of **commercial polymers**. Drivers of this activity are its members and their motivation to obtain value (to them and their business) from participation in the group. The group meets at least once per year and defines projects on which at least a significant part of the members agrees to work on and to commit resources.

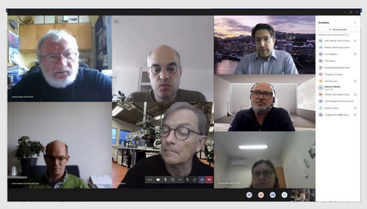
The projects have a particular scientific target and have been mainly experimental in nature. Coordinators guide the projects to the final publication(s). The projects conducted by the Subcommittee are funded by the participants and in turn their organizations. Participation in a project is voluntary but to maintain membership in the Subcommittee it is mandatory to participate in at least one project and to attend meetings (at least every two years). Its members enjoy the opportunity of working with like-minded scientist albeit that they come from often competitive organizations.

The balanced membership base from industry and academy works in a manner to ensure that the projects are structured in such a way as to accommodate value in application, need and scientific novelty. Membership in the Sub-committee offers a platform for collaboration on a global basis. It enables contacts and networks that would be difficult to establish by other means. In addition, the value that is generated from a joint scientific project where an individual (or his/her organization) is funding only a fraction of the cost can be considerable.

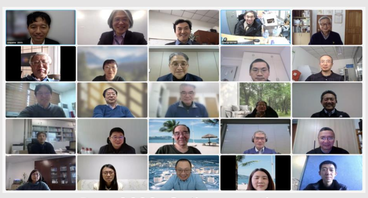
Due to geographical constraints, the Subcommittee runs two research meetings in parallel: one in western Europe (WE) including members from US and Canada and another in eastern Asia (EA) including China, Japan and Korea. Both WE and EA meetings have their chairs and secretaries elected by corresponding members.

Past group meetings


May 2018, Germany


May 2022, Online meeting


Nov. 2019, Japan


Dec. 2022, Online meeting

PROJECTS

RESEARCH TOPICS

- Rubber modified polymer
- LLDPE
- PAN-based carbon fibers
- PVDF
- PVA
- UHMWPE
- Ageing
- EDAM copolymer
- PLC fibers
- COC
- Long-chain branching PC
- PA6 and PA66 clay nanocomposites
- PTFE in PP
- TLCP blends
- PE
- G-resin (Polypropylene)
- Polyketone
- Biopolymers
- .....

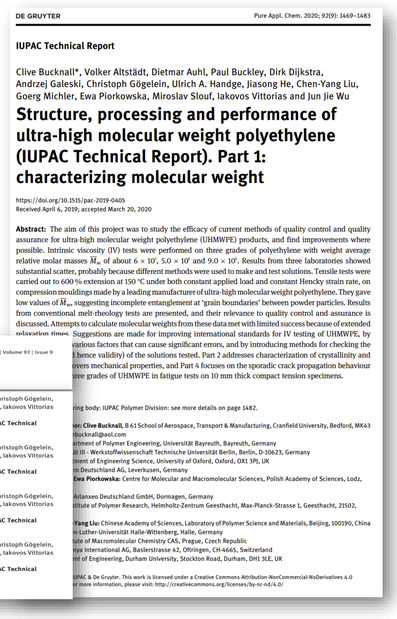
2010-019-1-400- Characterization, rheology and mechanical properties of high and ultra-high molecular weight polyethylene

Task Group Chair: Prof. Clive Bucknall

Task Group Members: Volker Altstädt, Dietmar Auhl, Paul Buckley, Dirk Dijkstra, Andrzej Galeski, Christoph Gögelein, Ulrich A. Handge, Jiasong He, Chen-Yang Liu, Goerg Michler, Ewa Piorkowska, Miroslav Slouf, Iakovos, Vittorias and Jun Jie Wu

OUTPUT

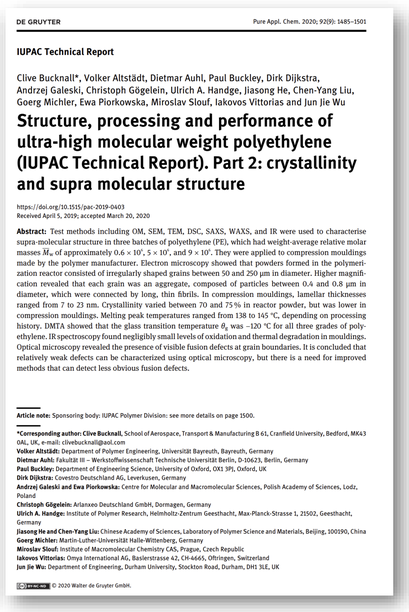
- Characterizing molecular weight , *PAC*. 2020
- Crystallinity and supra molecular structure, *PAC*. 2020
- Deformation, wear and fracture, *PAC*. 2020
- Sporadic fatigue crack propagation, *PAC*. 2020


DE GRUYTER Pure Appl. Chem. 2020; 92(9): 1469–1483

IUPAC Technical Report

Clive Bucknall*, Volker Altstädt, Dietmar Auhl, Paul Buckley, Dirk Dijkstra, Andrzej Galeski, Christoph Gögelein, Ulrich A. Handge, Jiasong He, Chen-Yang Liu, Goerg Michler, Ewa Piorkowska, Miroslav Slouf, Iakovos Vittorias and Jun Jie Wu

Structure, processing and performance of ultra-high molecular weight polyethylene (IUPAC Technical Report). Part 1: characterizing molecular weight


DE GRUYTER Pure Appl. Chem. 2020; 92(9): 1485–1501

IUPAC Technical Report

Clive Bucknall*, Volker Altstädt, Dietmar Auhl, Paul Buckley, Dirk Dijkstra, Andrzej Galeski, Christoph Gögelein, Ulrich A. Handge, Jiasong He, Chen-Yang Liu, Goerg Michler, Ewa Piorkowska, Miroslav Slouf, Iakovos Vittorias and Jun Jie Wu

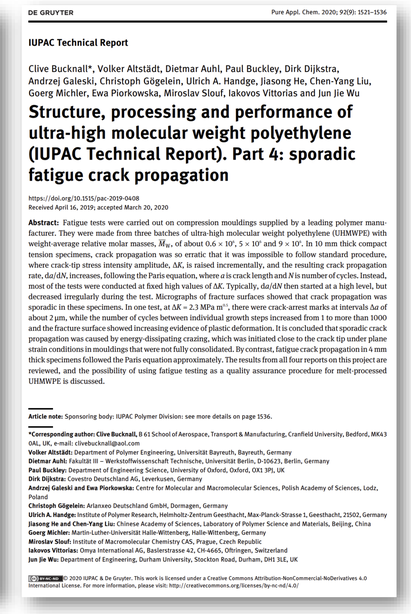
Structure, processing and performance of ultra-high molecular weight polyethylene (IUPAC Technical Report). Part 2: crystallinity and supra molecular structure


DE GRUYTER Pure Appl. Chem. 2020; 92(9): 1503–1519

IUPAC Technical Report

Clive Bucknall*, Volker Altstädt, Dietmar Auhl, Paul Buckley, Dirk Dijkstra, Andrzej Galeski, Christoph Gögelein, Ulrich A. Handge, Jiasong He, Chen-Yang Liu, Goerg Michler, Ewa Piorkowska, Miroslav Slouf, Iakovos Vittorias and Jun Jie Wu

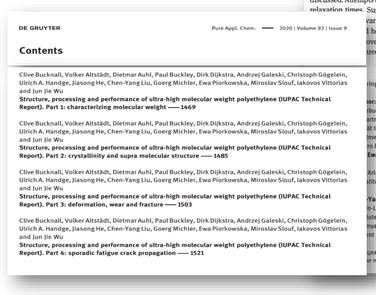
Structure, processing and performance of ultra-high molecular weight polyethylene (IUPAC Technical Report). Part 3: deformation, wear and fracture


DE GRUYTER Pure Appl. Chem. 2020; 92(9): 1521–1536

IUPAC Technical Report

Clive Bucknall*, Volker Altstädt, Dietmar Auhl, Paul Buckley, Dirk Dijkstra, Andrzej Galeski, Christoph Gögelein, Ulrich A. Handge, Jiasong He, Chen-Yang Liu, Goerg Michler, Ewa Piorkowska, Miroslav Slouf, Iakovos Vittorias and Jun Jie Wu

Structure, processing and performance of ultra-high molecular weight polyethylene (IUPAC Technical Report). Part 4: sporadic fatigue crack propagation


DE GRUYTER Pure Appl. Chem. 2020 | Volume 92 | Issue 9

Contents

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Structure, processing and performance of ultra-high molecular weight polyethylene (IUPAC Technical Report). Part 1: characterizing molecular weight —— 1469

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Structure, processing and performance of ultra-high molecular weight polyethylene (IUPAC Technical Report). Part 2: crystallinity and supra molecular structure —— 1485

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Structure, processing and performance of ultra-high molecular weight polyethylene (IUPAC Technical Report). Part 3: deformation, wear and fracture —— 1503

Clive Bucknall, Volker Altstädt, Dietmar Auhl, Paul Buckley, Dirk Dijkstra, Andrzej Galeski, Christoph Gögelein, Ulrich A. Handge, Jiasong He, Chen-Yang Liu, Goerg Michler, Ewa Piorkowska, Miroslav Slouf, Iakovos Vittorias and Jun Jie Wu
Structure, processing and performance of ultra-high molecular weight polyethylene (IUPAC Technical Report). Part 4: sporadic fatigue crack propagation —— 1521

2016-028-1-400 - Structure and Properties of Transparent Polypropylene with Very Low Solubility

Task Group Chair: Profe. Jinliang Qiao

Task Group Members: Yongfeng Men, Chang-Sik Ha, Koh-hei Nitta, Katsuhisa Tokumitsu, Iakovos Vittorias, Wenbing Hu, Liangshi Wang, Meifang Guo, Yujing Tang, Hongwei Shi

PROJECT AIM: Investigation on the relationship between the micro-structure and the properties of polymer with very low soluble contents

The task group has 5 publications, including 3 publications in *Polymer*, 1 in *European Polymer Journal* and 1 in *J Therm Anal Calorim*

NEW PROJECT PROPOSAL -Thermoplastic starch-based materials: properties and characterization.

Miroslav Slouf (coordinator)
Elvira Vidovic (co-coordinator)

Task group members:

Miroslav Slouf; Veronika Gajdosova; Saffana Kouka; Zdenek Stary; Magdalena Konefal; Elvira Vidovic; Dajana Kucic Grgic; Vesna Ocelic Bulatovic; Iakovos Vittorias; Iakovos; Dietmar Auhl; Sven Henning; Ulrich Handge; Maria Laura Di Lorenzo; Yongfeng Men

OBJECTIVES:

Optimization of starch plasticization, and deeper understanding relationships between structure and properties of starch-containing materials.

FEASIBILITY STUDIES

- Anti-bacterial and anti mildew PP resin.
- Polyketone – New Green Polymeric Material.
- Structure and properties of PLA.
- Recycling of mixed Polyolefins even PVAc, etc. using compatibilizer (also Rubber with CaCO3, Kaolin, fumed Silica as fillers)
- 3D-print vulcanisates, TPU, TPE, soft rubber materials, series of materials with thermoplastic content, x-linking, fillers
- PC/SAN BayBlend: compatibility studies

PERSPECTIVES

The subcommittee on structure and properties of commercial polymers welcomes scientists from both industry and academia to work on topics of mutual interests.

The key words of this subcommittee are "**commercial polymers**" and "**structure and properties**". These together with the fact of participation of multiple competitive companies define our research projects being applied fundamental in nature.

Over the past 60 years since its establishment, the subcommittee continuously operating smoothly via running projects that address common concerns of competing partners. Making knowledge useful via participating in a project attracts also researchers from academia.

In the future, we are looking forward to building stronger network among members and creating opportunities for joint efforts beyond IUPAC.

JOIN US IN OUR NEXT EVENT!

In-person EA research meeting & Workshop on Structure and Properties of Commercial Polymers

14-17 December 2023
Danzhou, Hainan, China

ORGANIZERS:
- Koh-hei Nitta
- Yongfeng Men
- Kenji Urayama
- Ying Lu

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