6th International Symposium on Polymers and Advanced Materials

ICSP & AM 6

17-20 July

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Welcome

Dear Colleagues,

On behalf of the Organizing Committee I wish to extend cordial welcome to all participants of the 5th International Caucasian Symposium on Polymers and Advanced Materials. 12 years ago, 2007, this symposium took place in Tbilisi, Georgia. We are delighted to host you in this year country Georgia, in very beautiful town Batumi. This year is significant for Ivane Javakhishvili Tbilisi State University since we celebrated the 100th anniversary of the foundation. This year, Professor M. Abadie was awarded the title of honorary doctor of Ivane Javakhishvili Tbilisi State University. These meetings led to the fact that we cooperate with Polish Universities in the Erasmus+ program. We hope that this symposium will in the future lead to the strengthening of close scientific relations.

The purpose of the conference is to encourage scientists working in polymer chemistry and advanced materials to present their investigations dedicated to problems and discoveries in above mentioned fields. Also “ICSP&AM 6” will help to introduce effectively innovative scientific researches of Georgian, Caucasian and neighboring scientific teams, which are less known for world scientific society. We hope that this year meeting, gathering almost 120 participants, shall provide a good platform for academic and industrial scientists to discuss recent advances in the area of polymers and advanced materials.

Professor Omar Mukbaniani

Organizing committee: Chair – Prof. Omar Mukbaniani
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Abstract

A NEW SOLUTION OF THE ROTARY BARREL SEGMENT OF A SINGLE-SCREW EXTRUDER

J. W. Sikora¹, J. Varga²

¹Faculty of Mechanical Engineering, Lublin University of Technology, 36 Nadbystrzycka Str., 20-618 Lublin, Poland
²Faculty of Mechanical Engineering, Technical University of Kosice, Masiarska 74, 040 01 Kosice, Slovakia
E-mail: janusz.sikora@pollub.pl

Until now, the general construction of the plasticizing system has assumed placing the screw in a fixed barrel. However, at the end of the 20th century, a completely new concept of the design of an extruder was put forward, which had never been used before in the industry or in experimental machines. This new solution consisted in kinematic activation of the barrel itself, which meant it could rotate in the direction identical or opposite to the direction of screw rotation. So far, several design solutions concerning kinematic activation of the barrel of the plasticizing system have been proposed. The idea of this solution is presented in the picture.

As a result of the implementation of the international NEWEX project within H2020-MSCA-RISE several new construction concepts were developed for which CAD models were created using the SolidWorks programme. All CAD models were made in such a way that they could constitute the modification of W-25 single-screw extruder, and all of them present a classic or modified screw placed in the barrel plasticizing system, therefore screw diameter D equals 25 mm. The joint length of rotational barrel elements equals 4D. The main reason for using such constructional solutions is the intensification of the mixing process and the increase of homogenization of the processed polymer, filled polymer or a composite. The strength and thermal calculations of selected models were carried out and computer simulations were performed concerning the optimization of the adopted solutions.

The most important aim is to maximize the mixing, quantified here by WATS, with little changes in the remaining criteria, i.e., output, melt temperature at die exit \(T_{melt}\), mechanical power consumption \(Power\), length of the screw required for melting \(L_{melting}\) and viscous dissipation.

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References: