

# FIBRES & TEXTILES in Eastern Europe

published by

*Instytut Biopolimerów i Włókien Chemicznych  
Institute of Biopolymers and Chemical Fibres  
(IBWCh), Łódź, Poland*

*In publishing participates Kaunas University  
of Technology (KTU), Kaunas, Lithuania*

## Editorial Office

*ul. Skłodowskiej-Curie 19/27, 90-570 Łódź, Poland  
tel. (48-42) 638-03-00, fax (48-42) 637-65-01  
e-mail: infor@ibwch.lodz.pl <http://www.fibtex.lodz.pl>*

## Editorial Department

*Editor-in-Chief*

*Bogdan Mac*

*V-ce Editor-in-Chief*

*Marta Cyrczak*

*Assistant Editors*

*Emilia Jaszczurska, Anna Wahl*

*Text Editor*

*Geoffrey Large*

*Typesetting*

*Andrzej Bodek*

*Printed at*

*Media-Press*

## Editorial Committee

*Danuta Ciecchańska (IBWCh)*

*Izabela Ciesielska (TUŁ)*

*Włodzimierz Cygan (TUŁ)*

*Karolina Grzebiński (IBWCh)*

*Ryszard Korycki (TUŁ)*

*Małgorzata Michniewicz (IBWCh)*

*Rimvydas Milašius (KTU)*

*Antoni Niekraszewicz (IBWCh)*

*Zbigniew Stępień (TUŁ)*

*Krystyna Twarowska-Schmidt (IBWCh)*

*Alojzy Urbanowski (IBWCh)*

*Dariusz Wawro (IBWCh)*

## Scientific Programming Board

*Chairman:*

*Prof. Andrzej Ziabicki*

*Polish Academy of Sciences, Warsaw, Poland*

*Members:*

*Prof. Christo Betchev*

*Technical University of Sofia, Bulgaria*

*Prof. Tadeusz Jackowski*

*Technical University of Łódź, Poland*

*Prof. Ryszard Kozłowski*

*Institute of Natural Fibres, Poznań, Poland*

*Prof. Izabella Krucińska*

*Technical University of Łódź, Poland*

*Prof. Anton Marcinčič*

*Slovak University of Technology,*

*Bratislava, Slovak Republic*

*Prof. Józef Masajtis*

*Technical University of Łódź, Poland*

*Prof. Vytautas Milašius*

*Kaunas University of Technology, Lithuania*

*Prof. Jiří Militký*

*Technical University of Liberec, Czech Republic*

*Prof. Heinrich Planck*

*Institute for Textile Techniques and Technology,*

*Denkendorf, Germany*

*Prof. Roshan Shishoo*

*Institute of Fibres and Polymers Research AB,*

*Mölnådal, Sweden*

*Prof. Sigita Stanys*

*Kaunas University of Technology, Lithuania*

*Prof. Zoran Stjepanović*

*University of Maribor, Slovenia*

*Prof. Janusz Szosland*

*Technical University of Łódź, Poland*

*Prof. Andrzej Włochowicz*

*University of Bielsko-Biala, Poland*



FIBRES & TEXTILES  
in Eastern Europe  
is decorated  
with the  
Golden Order  
of the Polish Textile  
Association



Volume 21, No. 5  
(101)

September / October  
2013

ISSN 1230-3666

Fibres & Textiles in Eastern Europe is inserted on the 'ISI Master Journal List' of the Institute for Scientific Information, Philadelphia, USA (for the year 2012 has an Impact Factor of 0.801) and is indexed in Research Alert, SCI Expanded (Sci Search and Web of Science), the Materials Science Citation Index, Current Contents/Engineering, Computing & Technology; as well as by the Textile Institute, Manchester, in the Information Service; and in Toga FIZ Technik; Rapra Technology Ltd.; Elsevier Geo Abstracts; Textiles Eastern Europe - World Textile Publications; Chemical Abstracts Service; and by Referativny Zhurnal.

The content of 'Fibres & Textiles in Eastern Europe' is available by free open access on the website <http://www.fibtex.lodz.pl>, starting from issue No 3/2002.

In Index Copernicus Journal Master List in 2012 FIBRES & TEXTILES in Eastern Europe ISSN 1230-3666 has received ICV = 13.43.

No part of this publication may be reproduced without the prior written permission of the publisher: Instytut Biopolimerów i Włókien Chemicznych - Institute of Biopolymers and Chemical Fibres.

No responsibility is assumed by the publisher for any injury and/or damage to persons or property as a matter of application of any methods, products, instructions or ideas contained in the material herein. Although all advertising material is expected to conform to ethical standards, inclusion in this publication does not constitute a guarantee or endorsement of the quality or value of such product.

On the cover a fragment of Jolanta Owidzka's structural tapestry 'Prayer book'

This issue is financially supported by the Ministry of Science and Higher Education.