Opto-thermo-mechanical Characterization for Polyester and Polyamide Surgical Sutures

Author(s): EL-Farahaty, KA (EL-Farahaty, K. A.)[1]; Seisa, EA (Seisa, E. A.)[1]; El-Sheikh, SG (El-Sheikh, S. G.)[1]

Source: INTERNATIONAL POLYMER PROCESSING Volume: 26 Issue: 2 Pages: 128-135
DOI: 10.3139/217.2371 Published: MAY 2011
Times Cited: **0** (from Web of Science)
Cited References: **22**

Abstract:
This work studies the opto-thermo-mechanical properties of two different surgical sutures using interferometry. The polarizing Pluta interference microscope combined with opto-thermo-mechanical (OTM) device were used to study the effect of drawing on monofilament polyester (PET) and polyamide (PA) surgical sutures at room temperature. The variation of the refractive indices and the birefringence of both PET and PA sutures with different draw ratios were determined. The resulting data was used to calculate the optical orientation function and the average work per chain. The stress strain curve was studied to estimate some mechanical parameters; yield stress, yield strain, Young's modulus and strain optical coefficient. The variations of the refractive the index profile were calculated for different draw ratios. In addition we studied the effect of temperature, during the drawing process, on monofilament PET suture. The obtained results provide important data for better characterization of suture materials.

Accession Number: WOS:000291078700002
Document Type: Article
Language: English
KeyWords Plus: FIBERS

Reprint Address: Seisa, EA (reprint author), Mansoura Univ, Fac Sci, Dept Phys, Mansoura, Egypt.
Addresses:
[1] Mansoura Univ, Fac Sci, Dept Phys, Mansoura, Egypt
E-mail Address: seisa@mans.edu.eg

Publisher: CARL HANSER VERLAG, KOLBERGERSTRASSE 22, POSTFACH 86 04 20, D-81679 MUNICH, GERMANY
Web of Science Categories: Engineering, Chemical; Polymer Science
Research Areas: Engineering; Polymer Science
IDS Number: 770HX
ISSN: 0930-777X

References:

1.Title: [not available]
Author(s): ANGAD GH
Source: J POLYM SCI PP Volume: 13 Pages: 835 Published: 1975

2. Title: [not available]
Author(s): Barakat, N; Hamza, AA.
Source: Interferometry of fibrous materials Published: 1990
Publisher: Adam Hilger, Bristol

3. Title: CONTINUING MEDICAL-EDUCATION - SELECTION OF WOUND CLOSURE MATERIALS
Author(s): BENNETT, RG
Source: JOURNAL OF THE AMERICAN ACADEMY OF DERMATOLOGY Volume: 18 Issue: 4 Pages: 619-640 DOI: 10.1016/S0190-9622(88)70083-3 Part: Part 1 Published: APR 1988

4. Title: Mechanical properties of suture materials: an important characterization.
Author(s): Chu, C C
Source: Annals of surgery Volume: 193 Issue: 3 Pages: 365-71 DOI: 10.1097/00000658-198103000-00021 Published: 1981-Mar

5.Title: [not available]
Author(s): DEVERIES H
Source: COLLOID POLYM SCI Volume: 257 Pages: 226 DOI: 10.1007/BF01382363 Published: 1979

6.Title: [not available]
Author(s): Ferry, J. D.
Source: Viscoelastic Properties of Polymers Published: 1980
Publisher: John Wiley and Sons, New York

7. Title: The effect of stretching on monofilament polypropylene sutures
Author(s): Fouda, I. M.; Seisa, E. A.
Source: JOURNAL OF POLYMER RESEARCH Volume: 15 Issue: 4 Pages: 259-268 DOI: 10.1007/s10965-007-9166-y Published: AUG 2008

8. Title: Optothermomechanical device for the interferometric characterization of fibers
Author(s): Hamza, AA; Sokkar, TZN; El-Farahaty, KA; et al.
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 95 Issue: 3 Pages: 647-658 DOI: 10.1002/app.21118 Abstract Number: A2005-14-0720-002 Published: FEB 5 2005

9. Title: Determination of the intrinsic birefringence of polymeric fibres
Author(s): Hamza, AA; Sokkar, TZN; El-Farahaty, KA; et al.
Source: POLYMER TESTING Volume: 23 Issue: 2 Pages: 203-208 DOI: 10.1016/S0142-9418(03)00081-3 Abstract Number: A2004-16-7820F-001 Published: APR 2004

10. Title: A CONTRIBUTION TO THE STUDY OF OPTICAL-PROPERTIES OF FIBERS WITH IRREGULAR TRANSVERSE SECTIONS
Author(s): HAMZA, AA
Source: TEXTILE RESEARCH JOURNAL Volume: 50 Issue: 12 Pages: 731-734 DOI: 10.1177/004051758005001207 Published: 1980

11. Title: On the determination of the refractive index of a fibre. II. Graded index fibre
Author(s): Hamza, A.A.; Sokkar, T.Z.N.; Ghander, A.M.; et al.
Source: Pure and Applied Optics Volume: 4 Issue: 3 Pages: 161-77 DOI: 10.1088/0963-

9659/4/3/004 Abstract Number: A1995-12-4281H-001; B1995-07-4125-019 Published: May 1995

12.Title: [not available]
Author(s): HOLMLUND EW
Source: ANN SURG Volume: 184 Pages: 189 Published: 1976

13. Title: STRETCHING OF PET FILMS UNDER CONSTANT LOAD .2. STRUCTURAL-ANALYSIS
Author(s): LEBOURVELLEC, G; BEAUTEMPS, J
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 39 Issue: 2 Pages: 329-339 DOI: 10.1002/app.1990.070390210 Published: JAN 20 1990

14. Title: INTERFERENCE MICROSCOPY OF POLYMER FIBERS
Author(s): PLUTA, M
Source: JOURNAL OF MICROSCOPY-OXFORD Volume: 96 Issue: DEC Pages: 309-332 Abstract Number: A1973-025727 Published: 1972

15. Title: DOUBLE REFRACTING INTERFERENCE MICROSCOPE WITH CONTINUOUSLY VARIABLE AMOUNT AND DIRECTION OF WAVEFRONT SHEAR
Author(s): PLUTA, M
Source: OPTICA ACTA Volume: 18 Issue: 9 Pages: 661-& Abstract Number: A1971-075192 Published: 1971

16. Title: [not available]
Author(s): SEISA EA
Source: INT POLYM PROC Volume: 2 Pages: 183 Published: 2006

17. Title: Controlling the mechanical properties of poly(L-lactide-epsilon-caprolactone) monofilament sutures by an acetone/water treatment
Author(s): Uddin, AJ; Katayama, N; Ohkoshi, Y; et al.Source: JOURNAL OF POLYMER SCIENCE PART B-POLYMER PHYSICS Volume: 40 Issue: 21 Pages: 2449-2462 DOI: 10.1002/polb.10300 Abstract Number: A2003-04-8770J-030; B2003-02-7520E-038 Published: NOV 1 2002

18. Title: [not available]
Author(s): von Fraunhofer, JA; Greisler, HP; Chu, CC.
Source: Wound Closure Biomaterials and Devices Published: 1997
Publisher: CRC Press, Boca Raton, Fla

19. Title: Tensile strength of suture materials.
Author(s): von Fraunhofer, J A; Storey, R S; Stone, I K; et al.
Source: Journal of biomedical materials research Volume: 19 Issue: 5 Pages: 595-600 DOI: 10.1002/jbm.820190511 Published: 1985 May-Jun

20. Title: OPTICAL AND MECHANICAL ANISOTROPY IN CRYSTALLINE POLYMERS
Author(s): WARD, IMSource: PROCEEDINGS OF THE PHYSICAL SOCIETY OF LONDON Volume: 80 Issue: 517 Pages: 1176-& DOI: 10.1088/0370-1328/80/5/319 Abstract Number: A1963-00917 Published: 1962

21. Title: [not available]
Author(s): WILLIAMS DJ
Source: POLYM SCI ENG Published: 1971

22. Title: [not available]
Author(s): ZBIGNIEW KW
Source: FORMATION SYNTHETIC Published: 1977

Influence of Grafting on Structural and Optical Properties of Nylon-6 Fibers

Author(s): Seisa, EA (Seisa, E. A.)

Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 117 Issue: 6 Pages: 3255-3261 DOI: 10.1002/app.32207 Published: SEP 15 2010
Times Cited: 1 (from Web of Science)
Cited References: 28

Abstract:
This study throws light on the change of the optical properties and some structural properties due to graft copolymerization of polydiallyldimethyl ammonium chloride (PDADMAC) and polyacrylamide (PAA) of nylon-6 fibers. Multiple-beam interferometric technique in transmission was used to study the change of the diameter, refractive indices, and birefringence of nylon-6 fibers at different graft yields. The results were utilized to investigate the isotropic refractive index, the mean polarizabilities per unit volume, dielectric constant, dielectric susceptibility, and surface reflectivity for nylon-6 and grafted nylon-6 fiber. The effect of grafted PAA onto modified nylon-6 fibers containing PDADMAC on the crystallinity was studied by X-ray diffraction. These results reflect good effect of grafting on the optical and structural properties of nylon-6 fibers. The opto-thermal properties of grafted PAA with different graft yields have been studied. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 117: 3255-3261, 2010

Accession Number: WOS:000279958200019
Document Type: Article
Language: English
Author Keywords: nylon-6 fiber; grafted nylon-6 fiber; polyacrylamide; interferometry; optical properties; X-ray diffraction
KeyWords Plus: BUTADIENE-STYRENE TERPOLYMER; MALEIC-ANHYDRIDE; VISCOSE FIBERS; COPOLYMERIZATION; ACRYLONITRILE; POLYMERIZATION; BIREFRINGENCE; POLYAMIDE-6; ACRYLAMIDE; POLYMERS

Reprint Address: Seisa, EA (reprint author), Mansoura Univ, Fac Sci, Dept Phys, Mansoura, Egypt.
Addresses:
[1] Mansoura Univ, Fac Sci, Dept Phys, Mansoura, Egypt
E-mail Address: seisa@mans.edu.eg

Publisher: JOHN WILEY & SONS INC, 111 RIVER ST, HOBOKEN, NJ 07030 USA
Web of Science Categories: Polymer Science
Research Areas: Polymer Science
IDS Number: 626HY
ISSN: 0021-8995

References:

1.Title: [not available]
Author(s): ABDELRAZIK EA
Source: J PHOTOCH PHOTOBIO A Volume: 35 Pages: 865 Published: 1992

2. Title: Homogeneous photoinduced graft copolymerization of acrylamide onto ABS copolymers in the presence of 4-acetyldiphenyl as photosensitizer .1. Influence of butadiene content in ABS copolymers
Author(s): AbdelRazik, EA; Ali, MM; Abdelaal, MY; et al.
Source: POLYMER-PLASTICS TECHNOLOGY AND ENGINEERING Volume: 35 Issue: 6 Pages: 865-876 DOI: 10.1080/03602559608000604 Published: 1996

3.Title: [not available]
Author(s): AHMED NG
Source: THESIS AIN SHAMS U E Published: 2002

4. Title: [not available]
Author(s): ALEKSANDRIISKII AS
Source: KHIM VOLOKNA Volume: 5 Pages: 34 Published: 1991

5.Title: [not available]
Author(s): ALEKSANDRIISKII AS
Source: KHIM VOLOKNA* Volume: 1 Pages: 29 Published: 1991

6. Title: [not available]
Author(s): BARKAT N
Source: INTERFEROMETRY FIBRO Published: 1990

7. Title: Opto-thermal behavior of polypropylene fibres using a modified hot-stage attached to the interference microscope
Author(s): Belal, AE; Hamza, AA; Sokkar, TZN; et al.
Source: POLYMER TESTING Volume: 21 Issue: 8 Pages: 877-882 Article Number: PII S0142-9418(02)00022-3 DOI: 10.1016/S0142-9418(02)00022-3 Abstract Number: A2002-24-7820F-001 Published: DEC 2002

8. Title: PHOTOINDUCED ACRYLAMIDE GRAFT-POLYMERIZATION ONTO POLYAMIDE-6
Author(s): BOGOEVAGACEVA, G; PIMONENKO, NY; PETROV, G
Source: TEXTILE RESEARCH JOURNAL Volume: 63 Issue: 1 Pages: 51-57 DOI: 10.1177/004051759306300106 Published: JAN 1993

9. Title: Radiation-induced graft copolymerization of binary monomer mixture containing acrylonitrile onto polyethylene films
Author(s): Choi, SH; Nho, YC
Source: RADIATION PHYSICS AND CHEMISTRY Volume: 58 Issue: 2 Pages: 157-168 DOI: 10.1016/S0969-806X(99)00367-9 Published: APR 2000

10. Title: NEW APPROACH TO THE CONTINUUM THEORY OF BIREFRINGENCE OF ORIENTED POLYMERS
Author(s): DEVRIES, H
Source: COLLOID AND POLYMER SCIENCE Volume: 257 Issue: 3 Pages: 226-238 Published: 1979

11. Title: Optomechanical properties of the morphology of viscose fibers due to the cold-drawing process
Author(s): Fouda, I. M.; Seisa, E. A.
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 110 Issue: 2 Pages: 872-879 DOI: 10.1002/app.28549 Published: OCT 15 2008

12. Title: Birefringence and orientation parameters of cold-drawn viscose fibers
Author(s): Fouda, I. M.; Seisa, E. A.
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 106 Issue: 3 Pages: 1768-1776 DOI: 10.1002/app.26849 Published: NOV 5 2007

13.Title: [not available]
Author(s): HAPPEY F
Source: APPL FIBRE SCI Published: 1983

14.Title: Preparation and characterization of supported hydrogels obtained by radiation grafting of binary monomers
Author(s): Hegazy, E-SA; Abd El-Rehim, HA; Khalifa, NA; et al.
Source: Radiation Physics and Chemistry Volume: 55 Pages: 219-29 DOI: 10.1016/S0969-806X(98)00329-6 Published: 1999

15.Title: [not available]
Author(s): HEMSLEY DA
Source: APPL POLYM LIGHT MIC Published: 1964

16. Title: Improvement of the adhesion of low-energy polymers by a short-time plasma treatment
Author(s): Petasch, W.; Raeuchle, E.; Walker, M.; et al.
Source: SURFACE & COATINGS TECHNOLOGY Volume: 74-75 Issue: 1-3 Pages: 682-688 DOI: 10.1016/0257-8972(94)08209-X Part: Part 2 Abstract Number: A1996-03-8160-032 Published: OCT 1995

17. Title: INTERFERENCE MICROSCOPY OF POLYMER FIBERS
Author(s): PLUTA, M
Source: JOURNAL OF MICROSCOPY-OXFORD Volume: 96 Issue: DEC Pages: 309-332 Abstract Number: A1973-025727 Published: 1972

18.Title: [not available]
Author(s): PLUTA MSource: OPT ACTA Volume: 18 Pages: 601 Published: 1971

19. Title: Modification of acrylonitrile-butadiene-styrene terpolymer by graft copolymerization with maleic anhydride in the melt. II. Properties and phase behavior
Author(s): Qi, RR; Qian, JL; Chen, ZF; et al.
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 91 Issue: 5 Pages: 2834-2839 DOI: 10.1002/app.13468 Published: MAR 5 2004

20. Title: Modification of acrylonitrile-butadiene-styrene terpolymer by grafting with maleic anhydride in the melt. I. Preparation and characterization
Author(s): Qi, RR; Qian, JL; Zhou, CX
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 90 Issue: 5 Pages: 1249-1254 DOI: 10.1002/app.12679 Published: OCT 31 2003

21. Title: Surface modification of nylon-6 fibers for medical applications
Author(s): Shalaby, S. E.; AI-Balakocy, N. G.; El-Ola, S. M. Abo
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 104 Issue: 6 Pages: 3788-3796 DOI: 10.1002/app.25954 Published: JUN 15 2007

22. Title: Graft copolymerization of glycidylmethacrylate onto modified nylon-6 fibers
Author(s): Shalaby, SE; Al-Balakocy, NG; El-Ola, SMA
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 99 Issue: 3 Pages: 613-618 DOI: 10.1002/app.21911 Published: FEB 5 2006

23.Title: A STUDY OF GRAFT-POLYMERIZATION OF METHACRYLIC-ACID TO POLYCAPROAMIDE USING A REVERSIBLE REDOX SYSTEM CONTAINING CU-2+ IONS
Author(s): SMIRNOVA, NV; GABRIELYAN, GA; GALBRAIKH, LS
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 47 Issue: 5 Pages: 833-837 DOI: 10.1002/app.1993.070470510 Published: FEB 5 1993

24. Title: Determination of degree of crystallinity of Nylon 1212 by wide-angle X-ray diffraction
Author(s): Song, JB; Ren, MQ; Chen, QY; et al.
Source: CHINESE JOURNAL OF POLYMER SCIENCE Volume: 22 Issue: 5 Pages: 491-496 Published: SEP 2004

25. Title: Modification of some properties of polyamide-6 by electron beam induced grafting
Author(s): Timus, DM; Cincu, C; Bradley, DA; et al.
Conference: 4th Topical Meeting on the Industrial Radiation and Radioisotope Measurement Applications (IRRMA 99) Location: RALEIGH, NORTH CAROLINA Date: OCT 03-07, 1999 Sponsor(s): Amer Nuclear Soc, Isotopes & Radiat Div; Amer Nuclear Soc, Eastern Carolinas Sect; N Carolina State Univ, Ctr Engn Applicat Radioisotopes; Quantum Res Serv Inc
Source: APPLIED RADIATION AND ISOTOPES Volume: 53 Issue: 4-5 Pages: 937-944 DOI: 10.1016/S0969-8043(00)00258-X Abstract Number: A2000-20-6180F-003 Published: OCT-NOV 2000

26. Title: Graft copolymerization of N-vinylimidazole on poly(ethylene terephthalate) fibers in a swelling solvent using azobisisobutyronitrile as initiator
Author(s): Unal, HI; Inegollu, C; Sanli, O
Source: TURKISH JOURNAL OF CHEMISTRY Volume: 27 Issue: 3 Pages: 403-415 Published: 2003

27.Title: [not available]
Author(s): Wunderlich, B.

Source: Macromolecular Physics Published: 1973
Publisher: Acad. Press, New York

28. Title: Kinetics and mechanism of grafting of undecylenic acid onto acrylonitrile-butadiene-styrene terpolymer
Author(s): Zhou, ZF; Huang, H; Liu, NC
Source: JOURNAL OF POLYMER SCIENCE PART A-POLYMER CHEMISTRY Volume: 39 Issue: 4 Pages: 486-494 DOI: 10.1002/1099-0518(20010215)39:4<486::AID-POLA1017>3.0.CO;2-B Published: FEB 15 2001

Influence of wavelength and temperature on the optical and some structural properties of polyester and polyamide surgical suture fibers

Author(s): EL-Farahaty, KA (EL-Farahaty, K. A.)[1] ; Seisa, EA (Seisa, E. A.)[1] ; El-Sheikh, SG (El-Sheikh, S. G.)[1]

Source: OPTICAL MATERIALS Volume: 32 Issue: 9 Pages: 928-935 DOI: 10.1016/j.optmat.2010.01.027 Published: JUL 2010
Times Cited: **0** (from Web of Science)
Cited References: **25**

Abstract:
The present article studies the optical properties dependent on wavelength and temperature for polyester PET and polyamide PA surgical suture fibers by interferometry. The polarizing Pluta interference microscope was used to investigate the changes of the optical and structural properties at different wavelengths and temperatures. The resulting data were utilized to calculate the spectral dispersions and some structural properties such as Cauchy's dispersion constants, the resonant wavelength, the oscillation energy, the dispersion energy, the optical permittivity and the dielectric susceptibility for PET and PA sutures with different wavelengths at room temperatures. Relationship between the optical parameters with different temperatures at constant wavelength of PET and PA suture fibers were given. The variation of refractive index, isotropic refractive index and birefringence profile were measured at different temperatures. (C) 2010 Elsevier B.V. All rights reserved.

Accession Number: WOS:000279620900017
Document Type: Article
Language: English
Author Keywords: Optical properties; Dielectric properties; Polyester and polyamide surgical suture; Interferometry
KeyWords Plus: INTERFERENCE MICROSCOPE; BEHAVIOR

Reprint Address: Seisa, EA (reprint author), Mansoura Univ, Fac Sci, Dept Phys, Mansoura 35516, Egypt.
Addresses:
[1] Mansoura Univ, Fac Sci, Dept Phys, Mansoura 35516, Egypt
E-mail Address: seisa@mans.eclu.eg

Publisher: ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
Web of Science Categories: Materials Science, Multidisciplinary; Optics
Research Areas: Materials Science; Optics
IDS Number: 621XU
ISSN: 0925-3467

References:

1. Title: [not available]

Author(s): Barakat, N; Hamza, AA.

Source: Interferometry of fibrous materials Published: 1990

Publisher: Adam Hilger, Bristol

2. Title: Opto-thermal behavior of polypropylene fibres using a modified hot-stage attached to the interference microscope
Author(s): Belal, AE; Hamza, AA; Sokkar, TZN; et al.
Source: POLYMER TESTING Volume: 21 Issue: 8 Pages: 877-882 Article Number: PII S0142-9418(02)00022-3 DOI: 10.1016/S0142-9418(02)00022-3 Abstract Number: A2002-24-7820F-001 Published: DEC 2002

3.Title: [not available]
Author(s): Born, M.; Wolf, E.
Source: Principles of Optics Published: 1989
Publisher: Pergamon, Oxford

4.Title: [not available]
Author(s): CHU CC
Source: POLYM BIOMATERIALS Published: 2002

5. Title: [not available]
Author(s): DEVERIES H
Source: COLLOID POLYM SCI Volume: 257 Pages: 226 DOI: 10.1007/BF01382363 Published: 1979

6. Title: Birefringence and orientation parameters of cold-drawn viscose fibers
Author(s): Fouda, I. M.; Seisa, E. A.
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 106 Issue: 3 Pages: 1768-1776 DOI: 10.1002/app.26849 Published: NOV 5 2007

7.Title: [not available]
Author(s): FOUDA IM
Source: J APPL POLYM SCI Volume: 91 Pages: 287 Published: 2004

8. Title: The effect of stretching on monofilament polypropylene sutures
Author(s): Fouda, I. M.; Seisa, E. A.
Source: JOURNAL OF POLYMER RESEARCH Volume: 15 Issue: 4 Pages: 259-268 DOI: 10.1007/s10965-007-9166-y Published: AUG 2008

9. Title: A CONTRIBUTION TO THE STUDY OF OPTICAL-PROPERTIES OF FIBERS WITH IRREGULAR TRANSVERSE SECTIONS
Author(s): HAMZA, AA
Source: TEXTILE RESEARCH JOURNAL Volume: 50 Issue: 12 Pages: 731-734 DOI: 10.1177/004051758005001207 Published: 1980

10. Title: On the determination of the refractive index of a fibre. II. Graded index fibre
Author(s): Hamza, A.A.; Sokkar, T.Z.N.; Ghander, A.M.; et al.
Source: Pure and Applied Optics Volume: 4 Issue: 3 Pages: 161-77 DOI: 10.1088/0963-9659/4/3/004 Abstract Number: A1995-12-4281H-001; B1995-07-4125-019 Published: May 1995

11.Title: [not available]
Author(s): MEYER RD
Source: REV SUTU MAT 1 Volume: 10 Pages: 260 Published: 1989

12. Title: COMMONLY USED SUTURE MATERIALS IN SKIN SURGERY
Author(s): MOY, RL; LEE, A; ZALKA, A
Source: AMERICAN FAMILY PHYSICIAN Volume: 44 Issue: 6 Pages: 2123-2128
Published: DEC 1991

13. Title: DEPENDENCE OF REFRACTIVE INDEX TEMPERATURE COEFFCIENT ON THERMAL EXPANSIVITY OF LIQUIDS
Author(s): MURPHY, CG; ALPERT, SS
Source: AMERICAN JOURNAL OF PHYSICS Volume: 39 Issue: 7 Pages: 834-& DOI: 10.1119/1.1986293 Abstract Number: A1971-048131 Published: 1971

14. Title: INTERFERENCE MICROSCOPY OF POLYMER FIBERS
Author(s): PLUTA, M
Source: JOURNAL OF MICROSCOPY-OXFORD Volume: 96 Issue: DEC Pages: 309-332
Abstract Number: A1973-025727 Published: 1972

15. Title: DOUBLE REFRACTING INTERFERENCE MICROSCOPE WITH CONTINUOUSLY VARIABLE AMOUNT AND DIRECTION OF WAVEFRONT SHEAR
Author(s): PLUTA, M
Source: OPTICA ACTA Volume: 18 Issue: 9 Pages: 661-& Abstract Number: A1971-075192 Published: 1971

16. Title: [not available]
Author(s): SAMULES RJ
Source: STRUCTURAL POLYM PRO Published: 1974

17. Title: Influence of drawing and temperature on the optical and structural properties of monofilament PP sutures
Author(s): Seisa, EA
Source: INTERNATIONAL POLYMER PROCESSING Volume: 21 Issue: 2 Pages: 183-188 Published: MAY 2006

18. Title: [not available]
Author(s): Subrahamanyam, NA.
Source: A textbook of optics Published: 1977
Publisher: Brj Laboratory, Delhi

19. Title: [not available]
Author(s): Tager, A. A.
Source: Physical Chemistry of polymers Published: 1978
Publisher: Khimiya, Moscow

20.Title: Controlling the mechanical properties of poly(L-lactide-epsilon-caprolactone) monofilament sutures by an acetone/water treatment
Author(s): Uddin, AJ; Katayama, N; Ohkoshi, Y; et al.

Source: JOURNAL OF POLYMER SCIENCE PART B-POLYMER PHYSICS Volume: 40 Issue: 21 Pages: 2449-2462 DOI: 10.1002/polb.10300 Abstract Number: A2003-04-8770J-030; B2003-02-7520E-038 Published: NOV 1 2002

21.Title: [not available]
Author(s): von Fraunhofer, JA; Greisler, HP; Chu, CC.
Source: Wound Closure Biomaterials and Devices Published: 1997
Publisher: CRC Press, Boca Raton, Fla

22. Title: [not available]
Author(s): WARD IM
Source: J POLYM SCI POLYM S Volume: 85 Pages: 1 Published: 1977

23. Title: Material dispersion in optical fibers.
Author(s): Wemple, S H
Source: Applied optics Volume: 18 Issue: 1 Pages: 31-5 DOI: 10.1364/AO.18.000031
Abstract Number: A1979-027377; B1979-017921 Published: 1979-Jan-1

24. Title: BEHAVIOR OF ELECTRONIC DIELECTRIC CONSTANT IN COVALENT AND IONIC MATERIALS
Author(s): WEMPLE, SH; DIDOMENI.M
Source: PHYSICAL REVIEW B Volume: 3 Issue: 4 Pages: 1338-& DOI: 10.1103/PhysRevB.3.1338 Abstract Number: A1971-028429 Published: 1971

25.Title: [not available]
Author(s): ZIABIKI S
Source: HIGH SPEED FIBER SPI Published: 1985

Effect of Creep Strain on the Optomechanical Properties and Some Structural Properties of Terylene Fibers

Author(s): Seisa, EA (Seisa, E. A.)

Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 113 Issue: 1 Pages: 516-525 DOI: 10.1002/app.30101 Published: JUL 5 2009
Times Cited: **0** (from Web of Science)
Cited References: **24**

Abstract:
This article sheds light on the effect of creep strain [epsilon(t); %] on the optomechanical properties and some structure properties of terylene fibers at several constant applied loads. Automated multiple-beam Fizeau fringes in transmission were used with a mechanical creep device attached to a wedge interferometer where the fiber was subjected to a constant load. This technique was used to determine the mean refractive indices and the mean birefringence values of terylene fibers under different conditions for epsilon(t). The obtained optical results were used to evaluate the optical orientation function, optical stress coefficient, density, crystallinity, and mean-square density fluctuation with epsilon(t). The obtained results show that, under a constant load, the terylene fibers extended with time, the rate of which decreased with time. An empirical formula is suggested to represent the variation of epsilon(t) of terylene fibers with time, and the constants of this formula were determined. A mechanical model is proposed to represent epsilon(t) of terylene fibers, which consists of two Kelvin elements combined in series, which were used to provide an accurate fit to the experimental creep curve. The stress-strain curve via creep was studied to determine some mechanical parameters of the investigated fibers: Young's modulus, yield stress, and yield strain. Illustrations with microinterferograms, graphs, and tables are given. (C) 2009 Wiley Periodicals, Inc. J Appl Polym Sci 113: 516-525, 2009

Accession Number: WOS:000265904500061
Document Type: Article
Language: English
Author Keywords: creep; fibers; polyesters
KeyWords Plus: POLYPROPYLENE FIBERS; BIREFRINGENCE; PARAMETERS; BEHAVIOR; SUTURES

Reprint Address: Seisa, EA (reprint author), Mansoura Univ, Fac Sci, Dept Phys, Mansoura 35516, Egypt.
Addresses:
[1] Mansoura Univ, Fac Sci, Dept Phys, Mansoura 35516, Egypt
E-mail Address: seisa@mans.edu.eg

Publisher: JOHN WILEY & SONS INC, 111 RIVER ST, HOBOKEN, NJ 07030 USA
Web of Science Categories: Polymer Science
Research Areas: Polymer Science
IDS Number: 443IX
ISSN: 0021-8995

References:

1.Title: [not available]
Author(s): Barakat, N; Hamza, AA.
Source: Interferometry of fibrous materials Published: 1990
Publisher: Adam Hilger, Bristol

2.Title: [not available]
Author(s): BERNHARD W
Source: MACROMOLECULAR PHYS Published: 1973

3.Title: Uni- and biaxial orientation of polymer films and sheets
Author(s): De Vries, AJ; Bonnebat, C; Beautemps, J.
Source: Journal of Polymer Science: Polymer Symposia Volume: 58 Issue: 1 Pages: 109-156 Published: 1977
URL: http://dx.doi.org/10.1002/polc.5070580111

4. Title: NEW APPROACH TO THE CONTINUUM THEORY OF BIREFRINGENCE OF ORIENTED POLYMERS
Author(s): DEVRIES, H
Source: COLLOID AND POLYMER SCIENCE Volume: 257 Issue: 3 Pages: 226-238 Published: 1979

5.Title: Influence of creep on optical properties of polypropylene fibers
Author(s): El-Farahaty, KA
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 67 Issue: 4 Pages: 621-627 DOI: 10.1002/(SICI)1097-4628(19980124)67:4<621::AID-APP4>3.0.CO;2-S Published: JAN 24 1998

6.Title: Dynamic optomechanical behaviour investigations on undrawn polypropylene fibres
Author(s): ElFarahaty, KA
Source: POLYMER TESTING Volume: 15 Issue: 2 Pages: 163-177 DOI: 10.1016/0142-9418(95)00028-3 Abstract Number: A1996-07-8170-004 Published: 1996

7.Title: STRUCTURE AND PROPERTIES OF POLYETHYLENETEREPHTHALATE CRYSTALLIZED BY ANNEALING IN HIGHLY ORIENTED STATE .1. MORPHOLOGICAL STRUCTURE AS REVEALED BY SMALL-ANGLE X-RAY-SCATTERING
Author(s): FISCHER, EW; FAKIROV, S
Source: JOURNAL OF MATERIALS SCIENCE Volume: 11 Issue: 6 Pages: 1041-1065 DOI: 10.1007/BF02396639 Abstract Number: A1976-066325 Published: 1976

8.Title: [not available]
Author(s): FOUDA IM
Source: INT J POLYM MATER Volume: 56 Pages: 965 DOI: 10.1080/00914030601163480 Published: 2007

9. Title: Interferometric study of creep deformation and some structural properties of polypropylene fiber at three different temperatures
Author(s): Fouda, I. M.; EL-Farahaty, K. A.; Seisa, E. A.

Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 110 Issue: 2 Pages: 761-768 DOI: 10.1002/app.28714 Published: OCT 15 2008

10. Title: Birefringence and orientation parameters of cold-drawn viscose fibers
Author(s): Fouda, I. M.; Seisa, E. A.
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 106 Issue: 3 Pages: 1768-1776 DOI: 10.1002/app.26849 Published: NOV 5 2007

11. Title: The effect of stretching on monofilament polypropylene sutures
Author(s): Fouda, I. M.; Seisa, E. A.
Source: JOURNAL OF POLYMER RESEARCH Volume: 15 Issue: 4 Pages: 259-268 DOI: 10.1007/s10965-007-9166-y Published: AUG 2008

12. Title: Evaluation of the form birefringence and other structural parameters due to thermal annealing for nylon 6 fibers
Author(s): Fouda, IM
Source: JOURNAL OF POLYMER RESEARCH-TAIWAN Volume: 9 Issue: 1 Pages: 37-44 DOI: 10.1023/A:1020667004572 Published: MAR 2002

13. Title: [not available]
Author(s): GRISKEY RG
Source: POLYM PROCESS ENG Published: 1995

14.Title: [not available]
Author(s): Hermans, PH.
Source: Contribution to the physics of cellulose fibres; a study in sorption, density, refractive power and orientation Published: 1946
Publisher: Elsevier Pub. Co., Amsterdam; New York

15.Title: [not available]
Author(s): Kuleznev, V.N.; Shershnev, V.A.
Source: The Chemistry and Physics of Polymers Published: 1990
Publisher: Mir Publishers, Moscow

16.Title: [not available]
Author(s): Morton, W. E.; Hearle, J. W. S.
Source: Physical Properties of Textile Fibers Published: 1962
Publisher: The Textile Institute, London

17. Title: RANDOM-COIL CONFIGURATIONS OF AROMATIC POLYESTERS - STRESS-OPTICAL BEHAVIOR OF POLY(DIETHYLENE GLYCOL TEREPHTHALATE)
Author(s): RIANDE, E; GUZMAN, J; TARAZONA, MP; et al.
Source: JOURNAL OF POLYMER SCIENCE PART B-POLYMER PHYSICS Volume: 22 Issue: 6 Pages: 917-929 DOI: 10.1002/pol.1984.180220601 Abstract Number: A1984-084209 Published: 1984

18. Title: Influence of drawing and temperature on the optical and structural properties of monofilament PP sutures
Author(s): Seisa, EA

Source: INTERNATIONAL POLYMER PROCESSING Volume: 21 Issue: 2 Pages: 183-188 Published: MAY 2006

19.Title: [not available]
Author(s): Van Krevelen, D. W. H. P. J.
Source: Properties of Polymers Published: 1976
Publisher: Elsevier Scientic Publishing, New York

20. Title: [not available]
Author(s): Ward, I.
Source: <IT>Structure and Properties of Oriented Polymers</IT> Published: 1975
Publisher: Applied Science, London

21. Title: [not available]
Author(s): Ward, IM; Sweeney, J.
Source: An introduction to the mechanical properties of solid polymers Published: 1993
Publisher: Wiley & Sons Inc, New York

22. Title: [not available]
Author(s): WARD IM
Source: J POLYM SCI POLYM S Volume: 53 Pages: 9 Published: 1977

23.Title: [not available]
Author(s): WILLIAMS DJ
Source: POLYM SCI ENG Published: 1971

24. itle: [not available]
Author(s): WOODS HJ
Source: PHYS FIBERS Published: 1955

The Activation Energy and Some Structural Parameters of Thermally Treated Polypropylene Suture Fibers

Author(s): Fouda, IM (Fouda, I. M.)[1]; Seisa, EA (Seisa, E. A.)[1]

Source: INTERNATIONAL JOURNAL OF POLYMERIC MATERIALS Volume: 58 Issue: 4 Pages: 191-201 Article Number: PII 908833816 DOI: 10.1080/00914030802639940 Published: 2009
Times Cited: **0** (from Web of Science)
Cited References: **22**

Abstract:
Multiple-beam Fizeau fringes in transmission were used to study the changes in optical parameters of thermally treated polypropylene PP suture fibers. Changes in the refractive indices and birefringence have been measured interferometrically on thermally treated PP suture fibers at temperatures of 19 to 400.5C. From the optical parameters; the mean polarizability of monomer units, the density, stress optical coefficient, the thermal stress and the activation energy of PP sutures were calculated. The results of density and optical measurements were used to calculate the crystallinity and the specific refractivity of the isotropic dielectric. Additionally, we calculated the mean square density fluctuation, the segment anisotropy, the molar refractivity and form birefringence. Relations between evaluated and measured parameters are given for illustration. The present study throws light on the changes due to slight thermal treatments as an example of thermal human end uses. Curves are given for illustration.

Accession Number: WOS:000264825600001
Document Type: Article
Language: English
Author Keywords: activation energy; crystallinity; form birefringence; interferometry; molar refractivity; orientation; polypropylene sutures
KeyWords Plus: OPTOTHERMAL PROPERTIES; NYLON-6 FIBERS; BEHAVIOR; DENSITY

Reprint Address: Seisa, EA (reprint author), Mansoura Univ, Fac Sci, Dept Phys, Mansoura 35516, Egypt.
Addresses:
[1] Mansoura Univ, Fac Sci, Dept Phys, Mansoura 35516, Egypt
E-mail Address: seisa@mans.edu.eg

Publisher: TAYLOR & FRANCIS AS, KARL JOHANS GATE 5, NO-0154 OSLO, NORWAY
Web of Science Categories: Polymer Science
Research Areas: Polymer Science
IDS Number: 428CM
ISSN: 0091-4037

References:

1.Title: [not available]
Author(s): Barakat, N.; Hamza, A. A.
Source: Interferometry of Fibrous Material Pages: 55 Published: 1990
Publisher: Adam Hilger, Bristol, New York, London

2.Title: [not available]
Author(s): DAWKINS JV
Source: DEV POLYM CHARACTERI Pages: 239 Published: 1983

3.Title: Uni- and biaxial orientation of polymer films and sheets
Author(s): De Vries, AJ; Bonnebat, C; Beautemps, J.
Source: Journal of Polymer Science: Polymer Symposia Volume: 58 Issue: 1 Pages: 109-156 Published: 1977
URL: http://dx.doi.org/10.1002/polc.5070580111

4.Title: [not available]
Author(s): DECONDIA F
Source: J POLYM SCI PHYS Volume: 23 Pages: 1217 Published: 1985

5. Title: NEW APPROACH TO THE CONTINUUM THEORY OF BIREFRINGENCE OF ORIENTED POLYMERS
Author(s): DEVRIES, H
Source: COLLOID AND POLYMER SCIENCE Volume: 257 Issue: 3 Pages: 226-238 Published: 1979

6. Title: [not available]
Author(s): FAMBRI L
Source: POLYMER Volume: 38 Pages: 110 Published: 1997

7. Title: STRUCTURE AND PROPERTIES OF POLYETHYLENETEREPHTHALATE CRYSTALLIZED BY ANNEALING IN HIGHLY ORIENTED STATE .1. MORPHOLOGICAL STRUCTURE AS REVEALED BY SMALL-ANGLE X-RAY-SCATTERING
Author(s): FISCHER, EW; FAKIROV, S
Source: JOURNAL OF MATERIALS SCIENCE Volume: 11 Issue: 6 Pages: 1041-1065
DOI: 10.1007/BF02396639 Abstract Number: A1976-066325 Published: 1976

8. Title: EVALUATION OF THE STRUCTURAL BEHAVIOR OF ANNEALED NYLON-6 FIBERS FROM DENSITY-MEASUREMENTS
Author(s): FOUDA, IM; ELTONSY, MM; SHABAN, AM
Source: JOURNAL OF MATERIALS SCIENCE Volume: 26 Issue: 18 Pages: 5085-5092
DOI: 10.1007/BF00549896 Abstract Number: A1991-148899 Published: SEP 15 1991

9. Title: Opto-thermal properties of fibres. Part 2: Investigation of optical parameter changes in annealed and quenched nylon 6-6
Author(s): Fouda, IM; Kabeel, MA; El-Sharkawy, FM
Source: POLYMERS & POLYMER COMPOSITES Volume: 5 Issue: 6 Pages: 431-441 Published: 1997

10. Title: Opto-thermal properties of fibres .1. Effect of annealing on the optical parameters of nylon 6 fibres
Author(s): Fouda, IM; Seisa, EA; ElFarahaty, KA

Source: POLYMER TESTING Volume: 15 Issue: 1 Pages: 3-12 DOI: 10.1016/0142-9418(95)00008-9 Abstract Number: A1996-06-7820D-001 Published: 1996

11.Title: [not available]
Author(s): GRISKEY RG
Source: POLYM PROCESS ENG Pages: 35 Published: 1995

12. Title: OPTOTHERMAL PROPERTIES OF FIBERS .1. RELATIONS BETWEEN OPTICAL-PROPERTIES AND CHANGE OF THE DENSITY AND MECHANICAL LOSS FACTOR FOR ANNEALED POLYESTER FIBERS
Author(s): HAMZA, AA; FOUDA, IM; ELTONSY, MM; et al.
Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 56 Issue: 10 Pages: 1355-1366 DOI: 10.1002/app.1995.070561017 Published: JUN 6 1995

13. Title: [not available]
Author(s): HAPPY F
Source: APPL FIBER SCI Volume: 1 Pages: 130 Published: 1983

14.Title: [not available]
Author(s): HAWARD W
Source: J POLYM SCI Volume: 1 Pages: 201 Published: 1956

15.Title: [not available]
Author(s): HEMSLEY DA
Source: APPL POLYM LIGHT MIC Pages: 88 Published: 1964

16.Title: [not available]
Author(s): JENKINS AD
Source: HDB POLYM SCI Volume: 1 Pages: 505 Published: 1972

17. Title: RANDOM-COIL CONFIGURATIONS OF AROMATIC POLYESTERS - STRESS-OPTICAL BEHAVIOR OF POLY(DIETHYLENE GLYCOL TEREPHTHALATE)
Author(s): RIANDE, E; GUZMAN, J; TARAZONA, MP; et al.
Source: JOURNAL OF POLYMER SCIENCE PART B-POLYMER PHYSICS Volume: 22 Issue: 6 Pages: 917-929 DOI: 10.1002/pol.1984.180220601 Abstract Number: A1984-084209 Published: 1984

18. Title: Influence of drawing and temperature on the optical and structural properties of monofilament PP sutures
Author(s): Seisa, EA
Source: INTERNATIONAL POLYMER PROCESSING Volume: 21 Issue: 2 Pages: 183-188 Published: MAY 2006

19. Title: [not available]
Author(s): WESOLOWSKA E
Source: J POLYM SCI PHYS ED Volume: 26 Pages: 2573 Published: 1988

20. Title: [not available]
Author(s): WILLIAM G
Source: J MATER SCI Volume: 2 Pages: 2355 Published: 1977

21.Title: [not available]
Author(s): WYCOFF H
Source: J POLYM SCI Volume: 62 Pages: 82 Published: 1962

22.Title: [not available]
Author(s): ZACHARIODES AZ
Source: STRENGTH STIFFNESS P Pages: 121 Published: 1983