[P1.001] Temperature-responsive bending studies of a PP-g-PNIPAAm mesh for hernia repair
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[P1.003] Synthesis and characterization of poly (styrene-co-acrylonitrile) nanofibers for potential development of artificial muscles
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[P1.004] Development of an easy method for measuring the flexural rigidity of nanofibres
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[P1.005] Effect of acoustic waves on heat transfer and hydrodynamics characteristics of fluidized bed for binary mixture of ultradine powder
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[P1.006] Smart composites with shape memory effect and piezoelectric effect for energy harvesting
X. Guan*, H. Chen, Q. Ni, Shinshu University, Japan

[P1.007] Fluorinated ethylene-propylene/graphite composite with preferred structural optimization by well-dispersed master batch
M.H. Lee*, S.M. Oh, B.C. Kim, K.S. Park, J.S. Woo, Morgan, Republic of Korea

[P1.008] Determination of the binding affinity of ZnO binding peptides via an indicator displacement assay and single molecule force spectroscopy
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[P1.009] Microstructure and densification behaviour of tungsten fabricated by spark plasma sintering
S-T. Oh*, H. Kang1, J-Y. Han1, Y-K. Jeong2, 1Seoul National University of Science and Technology, Republic of Korea, 2Pusan National University, Republic of Korea

[P1.010] Measuring spatially resolved viscosity and viscosity gradients at solid/liquid interfaces of aqueous solutions with a small sample volume by atomic force microscopy
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[P1.011] Developments of TiO2/porphyrin hybrid compounds and photocatalytic investigation on degradation of stains
Y.A. Son*, G. Heo, H. Kim, R.S. Kumar, R. Manivannan, Chungnam National University, Republic of Korea

[P1.012] Interfacial adhesion properties of two-dimensional materials
J.W. Suk, Sungkyunkwan University, Republic of Korea

[P1.013] Optimization on the deposition method of CZTS nanoparticles thin film for hole transport layer application in solar cell
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[P1.014] SAXS and WAXS study of cellulose nanocrystals
P.M. Worsch1, H.M.A. Ehmann1, S. Spirk2, 1Anton Paar GmbH, Austria, 2Graz University of Technology, Austria

[P1.015] The azathi-Michael reaction as a method of modifying unsaturated polymers
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Temperature-responsive bending studies of a PP-g-PNIPAAm mesh for hernia repair

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Stimuli-responsive polymeric materials are capable of responding chemically and/or physically to changes in their environment. Ideally, the response should be reversible, once the stimulus is withdrawn. Among all responsive polymer-based systems, thermos-responsive poly(N-isopropylacrylamide) (PNIPAAm) is the most studied, exhibiting an abrupt conformational change at ~32 °C [1].

Thermoresponsive PNIPAAm has been proposed as a smart, thermo-responsive actuator thanks to its ability to absorb water (< 32 °C) and restore its original shape [2]. Due to its lower critical solution temperature (LCST) value, very close to that of human bodies, this gel or its derivatives can be potentially used in wearable devices [3].

In this study, we report the bending properties of a mesh, able to act like thermo-responsive actuator. It was composed of commercial polypropylene (PP) and was modified by grafting its fibers with PNIPAAm. The final material was designed to operate in direct contact with physiological fluid, due to its applications in abdominal hernia repair.

Therefore, flexible devices of PP-g-PNIPAAm characterized by different microstructures were studied in the presence of PBS solutions, at different temperatures. The microstructure of the gel chains (chain length measurements) and the macromotion (bending angle observations) at different temperatures were related to achieve a fine tuning of the device motion. The study showed that the motion is affected by the amount and the position of the gel (upper fibers or among them) and by the crosslinking degree.

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