

IOCB
2024
Conference

The 1st International Online Conference on Biomimetics

15-17 May 2024 | Online

Program and Abstract Book

Organizers



Academic Open Access Publishing
since 1996



biomimetics

Sponsors



Media Partners



materials



Journal of
Functional Biomaterials



iocb2024.sciforum.net
[#IOC2024](https://twitter.com/IOCB2024)

The 1st International Online Conference on Biomimetics

15–17 May 2024 | Online



Basel • Beijing • Wuhan • Barcelona • Belgrade • Novi Sad • Cluj • Manchester

Organizing Committee

Conference Chair

Prof. Dr. Giuseppe Carbone

Session Chairs

Prof. Dr. Xu Hou

Prof. Dr. Marc Weissburg

Prof. Si-Qin Ge

Dr. Cheng-Quan Cao

Prof. Dr. Yongmei Zheng

Prof. Dr. Joseph Ayers

Dr. Ming-Xia Sun

Dr. Chu-Chu Li

Scientific Committee

Dr. Xiang Ge

Dr. Liang Li

Dr. Xiaoming Zhang

Prof. Dr. Ille C. Gebeshuber

Prof. Dr. Borodich Feodor

Dr. Daniel Ruiz

Prof. Dr. Thomas Speck

Dr. Antonio Concilio

Dr. Luca Patanè

Dr. Muhammad Ullah

Organised by



Conference Secretariat

iocb2024@mdpi.com

Welcome from the Chair

Dear Colleagues,

The 1st International Online Conference on Biomimetics, with a focus on “Advances in bioinspired materials, biomimetic design and device, bioinspired surfaces and interfaces, bioinspired robotics and bioinspired sensors”, will be held from **15–17 May 2024**. The main purpose of the conference is to promote biomimicry and bionics, and it is dedicated to research that relates to the most basic aspects of living organisms and the transfer of their properties to human applications and man-made devices.

This conference is an excellent opportunity for researchers and scientists in the field of biomimetics and bionics to interact with each other, communicate with colleagues, learn from each other, share ideas and experiences, jointly solve problems, and suggest alternative solutions for a better future in the bionics. A distinct advantage of this virtual international conference is that the participants are not required to travel and can simply attend the conference regardless of their location. Participants do not need to seek financial support for travel, nor do they need to leave the comfort of their home, office, and/or family to book a trip and, consequently, adjust to the corresponding time zone.

In the virtual conference setting, while the presenters can deliver live presentations simultaneously, the participants can contribute to the discussion and provide feedback orally and/or using the “Chat” and “Reaction” functions.

The main topics of this conference include:

Biomimetics of Materials and Structures

Biomimetic Design, Constructions, and Devices

Biomimetic Surfaces and Interfaces

Design and Control of Bioinspired Robotics

Biomimetic Application of Insect Functional Morphology

All accepted abstracts will be published on the conference’s website. Participants are expected to submit an abstract of 200 to 300 words and should refer to the abstract preparation guidelines at “Instructions for Authors”.

After the conference, the participants may submit a full paper to MDPI’s *Biomimetics* journal. After the review process, the authors of the accepted papers will receive a **20% discount** on the APC before the paper is published in *Biomimetics*.

On behalf of the Organizing Committee, I welcome your attendance to the **1st International Online Conference on Biomimetics** on, “Advances in bioinspired materials, biomimetic design and device, bioinspired surfaces and interfaces, bioinspired robotics and bioinspired sensors”.



Prof. Dr. Giuseppe Carbone

Conference Chair

Department of Mechanics,
Mathematics and Management,
Polytechnic University of Bari, Italy

sciforum-086730: Chameleon-like Self-Healing Flexible Materials Based on Ferrocenyl-Containing Polysiloxanes

Anastasia N. Kocheva, Konstantin V. Deriabin, Regina M. Islamova

St. Petersburg State University, 7/9 Universitetskaya nab., 199034 St. Petersburg, Russia

Animals such as chameleons change their skin colour in case of potential threat and recover damaged tissues [1]. Some ferrocenyl-containing polymers are similar to chameleon skin in terms of its colour-changing behaviour. For instance, they exhibit electrochromic properties due to easy reversible one-electron redox transition [2].

Another feature of chameleons represented in polymer materials is their self-healing ability. One of the most promising self-healing materials is silicone rubber [3]. Some silicone materials possess self-healing properties achieved through siloxane equilibrium. This mechanism is based on reversible interactions between “living” anionic centres and polysiloxane chains [2].

The siloxane equilibrium discussed above allowed us to prepare unique chameleon-like ferrocenyl-containing silicone rubbers (FSRs) which exhibit both electrochromic and self-healing properties [?]. Thus, FSRs were obtained through ring-opening anionic copolymerisation of cyclic siloxane monomers including octamethylcyclotetrasiloxane (D_4), tetraferrocenyl-substituted cyclotetrasiloxane (1,3,5,7-(2-ferrocenylethyl)-1,3,5,7-tetramethylcyclotetrasiloxane, Fc_4D_4), and bicyclic cross-linking agent (bis- D_4). The physicochemical properties of the FSRs were estimated by tensile tests and cyclic voltammetry. As a result, the tensile strength of the FSRs reached 0.1 MPa, and elongation at break was 215%. After one hour, the recovery of FSR self-healing efficiency at 25 and 100 °C reached 98%. The FSRs also possess redox activity (Fc/Fc^+ transformations at $E^0 = 0.43$ V) and electrical conductivity at the level of antistatic materials (approximately 10^{-10} S cm^{-1}). The FSR films change their colour from yellow (reduced state) to blue (oxidised state). Our chameleon-inspired materials could find potential application as redox-active and flexible electrochromic coatings.

This research was funded by the Russian Science Foundation (№ 23-23-00103).

References

1. Zheng, R. et al. // *ACS Appl. Mater. Interfaces* **2018**, *10*, 35533–35538, doi:10.1021/acsami.8b13249.
2. Rashevskii, A.A. et al. // *Coatings* **2023**, *13*, 1282, doi:10.3390/coatings13071282.
3. Deriabin, K.V. et al. // *Biomimetics* **2023**, *8*, 286, doi:10.3390/biomimetics8030286.



© 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).