Curriculum Vitae

Name, Surname Bele, Adrian

Personal Information Birth date: 20.01.1986; Mather toungh: Romanian; Other languages: English;
e-mail: bele.adrian@icmpp.ro; Work Adress: Grigore Ghica Vodă Alley ,41A, Iași, România, 700487;
ORCID: https://orcid.org/0000-0001-8602-5273; Researcher ID: D-4352-2019

Education

1. Degree: PhD / Smart Silicone Materials (Laboratory of Inorganic Polymers); Institution: Institute of Macromolecular Chemistry "Petru Poni", Iassi; Period: 2012 to 2017, Abstract: http://www.icmpp.ro/doctorate/anunturi/5/Rez_Engl_Teza_ABele.pdf
2. Degree: Master of Science / Gas absorption on thin liquid film columns (Chemical Engineering); Institution: "Gh. Asachi" Technical University, Faculty of Chemical Engineering and Environmental Protection "Cristofer I. Simionescu", Iassi; Period: 2009 to 2011;
3. Degree: Engineer (Chemical Engineering); Institution: "Gh. Asachi" Technical University, Faculty of Chemical Engineering and Environmental Protection "Cristofer I. Simionescu", Iassi; Period: 2005 to 2009;

Employment

Institution: "Petru Poni" Institute of Macromolecular Chemistry, Iasi. Period: 2015 to present | Researcher / Silicone-based dielectric elastomer for electromechanical applications and dynamic vapor sorption on different materials (Laboratory of Inorganic Polymers).

Summary of Scientific Activity

Patents: 2**; Scientific articles:** 35 (ISI Web of Knowledge - average impact factor per article - 5.21); **Book chapters**: 2; Conference proceedings: 2; **Conference talks:** 8; **Oral lectures:** 1; conference posters: 25; **H-index: 11** (Web of Science), **13** (Google Scholar); i10-index: 15 (Google Scholar); **Citations:** 281 (Web of Science), 354 (Google Scholar).

Scientific Grands and Training Schools

1. EuroEAP - Scientific mission grand (SMG): Green silicone based interpenetrating polymer networks as dielectric elastomers for electromechanical applications. Period: 27.06.-12.08.2017; Department: Danish Polymer Centre, Technical University of Denmark, Copenhagen, Denmark;
2. Inter-academic Exchange: Preparation and complex investigation of polymeric composites materials. Period: 29.06.2015 - 5.07.2015; Department: Polymer Institute, Bratislava, Slovak Republic;
3. ESNAM Training School: Dielectric Elastomer Transducers, Period: 25 – 27.03.2014, Darmstadt, Germany;
4. ESNAM Training School: Ionic Artificial Muscles, Period: 29 – 31.10.2013, Cartagena, Spain;
5. EuroEAP Short Term Scientific Mission (STSM): Testing new materials with improved dielectric breakdown strength and reduced current leakage, Period: 27.09 – 12.10.2013, Department: PERCO laboratory for soft robotics, Scuola Superiore Sant'Anna, Pisa, Italy;

Patents

1. **Title:** High permittivity polymers based on functionalized silicones, Authors: D. M. Opris, S. Dunki, C. Racleș, **A. Bele**, M. Cazacu, Patent nr.: I.P.N. WO 2015/135086 A1;
2. **Title:** Modular Installation and Process to obtain Multi-Layer Polymeric Generators, Authors: A. Bele, M. Cazacu, M. Neagu, M. Popescu, C. Racles, Patent nr.: A/00127/2018.

Awards

1. Gold Metal at INVENTICA 2018: Modular Installation and Process to obtain Multi-Layer Polymeric Generators, Authors: **Bele A.,** Cazacu M., Neagu M., Popescu M., Racles C., Patent nr.: B32B 25/20, H01G 9/04;
2. Excellence Innovation Award: Modular Installation and Process to obtain Multi-Layer Polymeric Generators, Authors: **Bele A.,** Cazacu M., Neagu M., Popescu M., Racles C., Patent nr.: A/00127/2018.04 (offered by M. C. Costoiu, University of Bucharest at INVENTICA 2018)

Oral Presentations (invited)

1. **Adrian Bele** et al.: *Silicone-based materials for electromechanical applications,* ISPO 2017, 02–06.07, 11th International Workshop on Silicone Polymers, Snekkersten, Denmark.

Oral Presentations (3 most relevant, only as 1st author)

1. **A Bele,** et al.: *Flexible electrodes for dielectric elastomer generators,* ZAI 2015, 24–26.09, a XXV-a Sesiune de Comunicări Stiințifice a Institutului de Chimie Macromoleculară „Petru Poni", Iași, Romania;
2. **2. A Bele,** M Cazacu: *Highly stretchable and compliant PDMS/carbon-based electrodes for energy harvesting,* PolyWEC annual project meeting - 2015, Edinburgh, Scotland;
3. **A Bele** et al.: *Obtaining silicone-based composites and their test as artificial muscles*, Appolonia 2014, 27.02–01.03, International Congress "Pregătim Viitorul Promovând Excelenţa", Iași, Romania

Scientific articles (* - corresponding author, 5 most relevant)

1. Successfully designed silicone-based dielectric elastomer generators that possess high compliance between the dielectric elastomer and the electrode layer at very high strains (200 %) achieved by co-crosslinking **(A. Bele*** et al.: *Conductive stretchable composites properly engineered to develop highly compliant electrodes for dielectric elastomer actuators*, **Smart Mater. Struct. 27 (2018) 105005; IF: 3.543, red region);**
2. Optimized synthesis procedures to obtain predefined shapes of the final nanoparticles and improved compatibility between ceramic fillers and silicone matrix; the final DET product gave a 7.8 % conversion efficiency from mechanical to electrical energy **(A. Bele** et al., *Ceramic nanotubes-based elastomer composites for applications in electromechanical transducers,* **Materials & Design 141 (2016) 120 – 131; IF: 5.77, red region);**
3. Functional silanes as fillers and cross-linking agents were used to obtain dielectric elastomers; throughout optimizing the process, the proper recipe with chloropropyl groups drove to a low Young's modulus material and high lateral actuations were registered, 1.68 % at 0.83 V/µm **(A. Bele** et al.: *Dielectric silicone elastomers filled with in situ generated polar silsesquioxane: Preparation, characterization and evaluation of electromechanical performance*. **Materials & Design 106 (2016) 454 – 462; IF: 5.77, red region);**
4. Developed systems where cyanopropyl groups were added to the main backbone of the silicone polymer by hydrosilylation along with hexyl pendant non-polar groups; finally the copolymers were mixed with a PDMS pre-polymer in order to obtain elastomers that led to an increased permittivity (~4.5), good

breakdown strength values (~56 V/μm) and 13-times higher actuation strains (as compared with pure PDMS) **(**C. Racles*, **A. Bele**, et al., *Polar–nonpolar interconnected elastic networks with increased permittivity and high breakdown fields for dielectric elastomer transducers,* **RSC Adv. 5 (2015) 58428–58438 (IF: 3.049, yellow region)**

5. Comprehensive understanding of obtaining methodology regarding composites and fully characterization of the obtained results thereof **(A. Bele**, M. Cazacu* et al.: *Polydimethylsiloxane–barium titanate composites: Preparation and evaluation of the morphology, moisture, thermal, mechanical and dielectric behaviour*. **Composites Part B Engineering 50 (2015) 6822-6832; IF: 6.864, red region)**

Book Chapters

1. The applicant gave a recent overview of the basic and up-to-date strategies used to improve electromechanical properties of silicone elastomers by means of chemical design. Chemical designs include strategies ranging from addition of polar moieties by different chemical reactions (hydrosilylation, UV thiol-ene) on the main backbone to polar crosslinkers or molecular fillers containing polar groups (C. Racles*, M. Dascalu, **A. Bele**, M. Cazacu: *Chapter X. Reactive and functional silicones for special applications,* **Springer Nature, 2019, Accepted**)
2. Different strategies for chemical modification of silicones with cyanopropyl polar group are presented aiming to give an overview. The applicant proved abilities to gather information and bring forward the essence which involves deep understanding of advantages and disadvantages in his research field (C. Racles*, M. Alexandru, V. Musteata, **A. Bele,** M. Cazacu and D. M. Opris: *Chapter 2. Tailoring the dielectric properties of silicones by chemical modification.* **Recent Res. Devel. Polymer Science, 12(2014): 17-36 ISBN: 978-81-7895-611-4)**