



Photonic Materials for Lighting

chaired by Universidade de Aveiro, Portugal
Aveiro Institute of Materials (CICECO)

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Information and registration

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Sol-gel derived organic-inorganic hybrids for lighting

Rute Ferreira, Department of Physics, University of Aveiro

How light defies the Lighting

Vânia Teixeira, Lightenjin II – Indústria de iluminação Lda (<https://lightenjin.pt/>)

Lights on at Simoldes

Ana Rita Bastos & Rita Frias, Simoldes Plastic Division (<https://www.simoldes.com>)

FUNGLASS DAYS – “Photonic Materials for Lighting”

**Rute Ferreira, “Sol-gel derived organic-inorganic hybrids for lighting”,
Department of Physics, University of Aveiro**

ABSTRACT

White light-emitting diodes (WLEDs) revolutionized the lighting industry providing high energy efficiency, long lifetime and environmentally friendly properties. Despite the current maturity and reliability of the solid state-lighting, challenges include the control of the correlated color temperature (CCT), arising from the lack of red in the current design of commercial WLEDs. The recent development of efficient ultraviolet (UV) LEDs pushed forward the development of warmer WLEDs based on single-phase or mixtures of down-shifting phosphors. The contribution of boehmite nanoparticles and of polymeric and organic-inorganic coatings modified by lanthanides and dyes will be revisited. Examples include, nanoplates with quantum yields of 38% used to fabricate a WLED prototype with CCT= 6,111 K, sustainable WLEDs with tunable and enhanced color features based on flexible films of di-ureasil hybrids doped with carbon dots with tunable CCT from cold (5796 K) to warm (4228 K) white-light, and Eu(III)-based polymeric films with desirable features for coatings of deep-UV emitting LEDs toward multifunctional devices for plants circadian rhythm control applications.

BIO

Rute A. S. Ferreira got her PhD in Physics (2002), and the *Agregação (habilitation)* in Physics from the Universidade de Aveiro (UA), Portugal. Currently, she is an Associate Professor in the department of physics at UA. She is vice-director of CICECO – Aveiro Institute of Materials and a member of the general board of UA. Her current scientific interests are focused on the optoelectronic studies of organic/inorganic hybrids foreseeing applications in the fields of solid-state lighting, photovoltaics (luminescent solar concentrators and down-shifting layers) and mobile optical sensing for the Internet of Things.

FUNGLASS DAYS – “Photonic Materials for Lighting”

**Vânia Teixeira, “How light defies the Lighting”,
Lightenjin II – Indústria de iluminação Lda (<https://lightenjin.pt/>)**

ABSTRACT

During the last decade, the technological advances allowed different stages of maturity/complexity in lighting. Lighting, as a mandatory element that allows object visualization, in the absence of sunlight, has acquired several functions, such as, health and well-being, derived from technological advances. Today, solid state lighting (SSL) technology achieved efficiencies above 200 lm/W that can be used in areas such as sustainable growth of vegetables, replication of the quality of the colors and textures of objects under artificial lighting, sustainability and light energy to guarantee safety on the streets and regulation of the circadian rhythm becoming an element that act as a treatment for diseases.

BIO

Vânia Teixeira is graduated in Biomedical Engineering and Master in Micro/Nano Technologies from the University of Minho in Portugal. She received in 2016 her PhD in Physics from the University of Aveiro in Portugal and the University of Montpellier in France. Between 2009 and 2016 worked on the synthesis of new silsesquioxane organic-inorganic bridge bridging hybrid materials, and characterized the local structure and photoluminescence properties overlooking potential applications in the field of green photonics, namely in solid-state lighting and luminescent solar concentrators. Derived from this work, 17 articles have been published in international journals associated with the scientific index. In 2017 started a new project as R&D project coordinator at Lightenjin II - Indústria de Iluminação Lda in Águeda - Portugal. During the last 5 years, she was the responsible for the implementation of the NP4457 standard and R&D lighting projects.

FUNGLASS DAYS – “Photonic Materials for Lighting”

**Ana Rita Bastos & Rita Frias, “Lights on at Simoldes”,
Simoldes Plastic Division (<https://www.simoldes.com>)**

ABSTRACT

Simoldes Plásticos is a Portuguese company with over 40 years of experience in the injection of plastic parts for the automotive market. Simoldes Plásticos is part of the Simoldes Group, one of the largest and best producers of steel moulds and thermoplastic injection parts worldwide. Some of our main customers include the former PSA Group, VW, Skoda, Seat, Opel, Renault, Audi, Toyota, and Porsche. Simoldes Plásticos seeks to increase the ability to produce more complex parts and to integrate strategic business opportunities. In this spirit, Simoldes Plásticos has decided to integrate the competence and skills to develop interior/ambient lighting for the automotive industry, in house, to increase its competitive advantage. To this end, Simoldes established a lighting unit team responsible for the development of interior lighting projects, including prototype and mass production.

BIO

Ana Rita Bastos received her Ph.D. degree in Telecommunications from the University of Aveiro (Portugal) in 2018, where she worked on photonic integrated circuits based on organic-inorganic hybrids for optical communications and sensing. Next, she had a post-doctoral position in Phantom-G research group at CICECO-Institute of Material. During this period, Ana Rita was involved in the characterization of efficient heating-sensing nanoplatforms and in the development of a self-powered sustainable temperature sensor using solar energy and nature-based molecules for smart windows. Then, she joined the Optical Quantum Communications Group at Instituto de Telecomunicações, where quantum-enabled cryptographic systems were implemented. Currently, she is located at the R&D department of Simoldes Plásticos, Portugal. There, Ana Rita is an electronic engineer at the lighting unit, and her main activities are the development of hardware and software solutions for ambient lighting in the automotive industry. Additionally, she also gives support to R&D projects at Simoldes.

Ana Rita Frias received her Ph.D. degree in Physics from the University of Aveiro (Portugal) in 2019, where she worked on high performance luminescent solar concentrators for flexible waveguiding photovoltaics. Next, she had a post-doctoral position in Instituto de Telecomunicações. During this period, Ana Rita was involved in the development of experimental and simulation work with plastic optical fibers for optical communications and sensors with the aim of establishing new transmission records and new optical sensors. Then, she joined Castros Iluminações as an R&D project engineer to develop solutions for the integration of light and responsive technology in different materials and to develop a multifunctional device for disinfecting / sterilizing surfaces and air with UV-C in order to combat COVID-19. Currently, she is located at the R&D department of Simoldes Plásticos, Portugal. There, Ana Rita works as an optical engineer and is the lighting unit manager, being responsible for the optical simulations and design for ambient lighting in the automotive industry. Additionally, she also gives support to R&D projects at Simoldes.