

Flexpol Ecosystem: Developing a bacterial repelling and killing film.

Nikolaos Kehagias

Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC and  
BIST, Campus UAB, Bellaterra, 08193 Barcelona, Spain  
E-mail: nikos.kehagias@icn2.cat

The EU project FLEXPOL is developing an adhesive anti-bacterial film product that provides a low-cost solution to reduce the percentage of bacterial grown on surfaces targeting to decrease the nosocomial infections.

Nosocomial infections caused by bacteria and multi resistant microorganisms are the cause for approximately 125,000 deaths in the EU each year. The increasing number of bacteria resistant to antibiotics along with the growing demand for hospital utilisation due to ageing population has caused the scientific community to investigate alternative methods for preventing bacteria growth.

The efficiency of the "FLEXPOL film" is based on a two-way synergetic effect. First, the intermediate layer of the three-layered films has been doped with encapsulated essential oils (EO), which are released in a controlled manner. These essential oils have proven highly antimicrobial efficiency and diffuse from the inner film layer over time killing the bacteria which rest on the surface. On the other hand, the external top layer of the "FLEXPOL film" has been structured with a combination of micro and nanostructures. These hierarchical micro/nano topographies prevent liquid accumulation due to their "lotus-leaf" effect properties thus repelling any microorganism's accumulation.

Utilising a low cost and high throughput nanomanufacturing processes (roll to roll nanoimprint lithography) and in combination with the eco-friendly materials (EO) used to fabricate the "FLEXPOL film", we address an adequate solution for long shelf life time (> 6 months) and recyclable solution suitable to fulfil the needs of patients and healthcare personnel.

Ten institutions from across Europe are contributing to the FLEXPOL pilot project each of which is contributing to the pilot line production of our bactericide film. The profile of the FLEXPOL consortium is well balanced between academic research and industrial partners, and includes two collaborating universities, five applied research institutes and three industrial partners.

Acknowledgments: The work is supported by the project NMBP-PILOT-2016-721062 (FLEXPOL).