

Multigradient platforms for selective bacterial entrapment

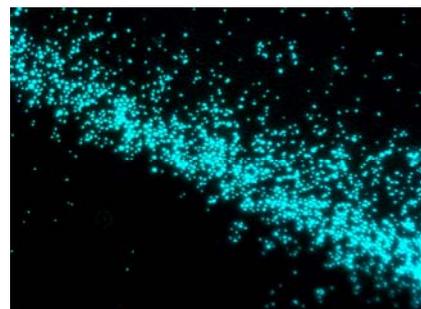
The Spanish National Research Council (CSIC) in collaboration with IMDEA-Nanociencia has developed new platforms with multigradient porous polymeric surfaces. These surfaces exhibit either simultaneously or separately, a gradient of pore size, shape and/or composition. The platforms are suitable for selective immobilization and/or isolation of bacteria. In particular, they were tested for effective immobilization and separation of *Escherichia coli* and *Staphylococcus aureus*. The main application of these materials can be found in the biomedical or biotechnological sector.

An industrial partner for a license agreement is sought

A simple one step method

Gradient surfaces (GS) consist of interfaces in which a particular characteristic gradually varies as a function of the position between the two extremes. The interest on the preparation of gradient surfaces relies on their potential uses, in particular for drug discovery and as cell culture systems. Current methods to produce SG require sophisticated techniques and in some case the use of expensive equipment.

Researchers of CSIC and IMDEA-Nanociencia have developed platforms with multigradient porous surfaces by means of “breath figures” technique. This method allows to prepare in a single and straightforward step platforms with porous surfaces in which three different parameters (pore size, shape and/or composition) vary gradually from the edge of the sample to the center. The gradient in chemical composition is controlled by the use of polymer blends consisting in a polymer matrix and functional copolymers. These novel substrates could represent an important milestone for selective entrapment of microorganisms, and in particular of bacteria.



Adhesión of *S. aureus* to platform

Main applications and advantages

- Preparation method is simple and allows to obtain in one step platforms with multigradient surfaces where pore size, shape and/or composition can vary either simultaneously or separately. It could represent an important cost reduction when compared with current methods.
- Preparation process is versatile since it allows to obtain platforms where surface topography can be tailored according to the shape and size of bacterium to be immobilized.
- Substrates have been tested for effective immobilization of two types of bacteria: *E. coli* and *S. aureus*.

Patent Status

Spanish patent filed with possible international extension.

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