

Functionalization of polystyrene surfaces in a low cost and controlled way, maintaining its transparency, for applications in biomedicine and pharmacy

CSIC has developed a method to functionalize polystyrene surfaces in a controlled way. First, a chlorosulfonation of polymer surface is carried out followed by a reaction with bifunctional molecules. Surface can be functionalized with a wide range of groups. These substrates are suitable for diagnostic essays like ELISA or DNA chips.

An Industrial Partner interested in a license agreement is sought

Substrates are suitable for biomolecule anchorage

The method involves a two-step wet chemical treatment. First, a chlorosulphonation of the polymer surface is carried out. Second, polystyrene modified with chlorosulfonyl is immersed in aqueous solution of bifunctional alkanes being one of these functional groups an aliphatic amine. This acts as an anchoring site to the surface by means of a covalent sulphonamide linkage. The second functional group determines the functionality of the surface. This group remains free and available for further biomolecule anchorage.



Functionalized substrates are suitable for diagnostic essays like ELISA or DNA chips.

Main applications and advantages

- **Higher number of functional groups:** the number of functional groups is 1-2 orders of magnitude larger than that obtained with other methods.
- **Homogeneity and reproducibility:** homogeneous surfaces with a controllable number of functional groups are obtained. Only the preselected functional group is reproducibly and selectively obtained. In the case of amines, only primary aliphatic amine groups are obtained and not a mixture of functional groups like in commercial products.
- **Process versatility:** surfaces can be functionalized with a wide variety of groups: amine, carboxy, sulphonic, sulphonazides or metilic esthers.
- **Optical quality:** transparency of the surface is preserved.
- **Adaptability:** it is possible to adjust the distance between the surface and the created amine groups by means of the length of the applied aliphatic spacer. This allows an excellent accessibility for the biomolecules.
- **Applicability:** functionalized substrates are suitable for diagnostic assays of ELISA or DNA chips type.

Patent Status

Spanish patent.

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