

Claims

1. A method for forming polymer brushes on a surface, wherein a surface having polymerisation initiators immobilised thereon is brought into contact with a polymerisation medium, **characterised in** that a swellable and removable polymer gel is used during the formation of the polymer brushes.
2. A method according to claim 1, **characterised in** that the polymer gel is swellable in the polymerisation medium, and in that the polymer gel is removable following formation of the polymer brushed on the surface.
3. A method according to claim 1 or 2, **characterised in** that the polymer gel is swellable in water, in a mixture of water and an alcohol, in a mixture of water and an aprotic solvent, or in an aprotic solvent.
4. A method according to any one of claims 1-3, **characterised in** that the cross-linking of the polymer gel is reversible.
5. A method according to any one of claims 1-4, **characterised in** that the polymer gel is polyallylamine (PAH)/tannic acid (TA)/Fe(III), chitosan/TA/Fe(III), collagen/TA/Fe(III), polyvinyl imidazole, poly(phosphoric acid 2-hydroxyethyl methacrylate ester), or saccharides such as sodium alginate, xanthan gum and cyclodextrins.
6. A method according to any one of claims 1-4, **characterised in** that the polymer gel has metal chelating sites.
7. A method according to any one of claims 1-6, **characterised in** that the polymer gel is applied to the surface swelled in the polymerisation medium.
8. A method according to any of claims 1-7, **characterised in** that the swelled polymer gel is removable by adjustment of pH or temperature, by light exposure, by sonication.

9. Use of a swellable and removable polymer gel in the formation of polymer brushes for evenly distributing a polymerisation medium on a surface having polymerisation initiators immobilised thereon.

5 10. Use according to claim 9, **characterised in** that the polymer gel is swelled in the polymerisation medium, and in that the polymer gel is removable following formation of the polymer brushes on the surface.

10 11. Use according to claim 8 or 9, **characterised in** that the polymer gel is polyallylamine (PAH)/tannic acid (TA)/Fe(III), chitosan/TA/Fe(III), collagen/TA/Fe(III), polyvinyl imidazole, poly(phosphoric acid 2-hydroxyethyl methacrylate ester), or saccharides such as sodium alginate, xanthan gum and cyclodextrins.