the block copolymer being constant, whatever the targeted molecular weight of the block copolymer, the change in the period characterizing the morphology remains equivalent.

Summary:

~~In an aspect, t~~There is provided a process for controlling the period characterizing the morphology obtained starting from a blend of block copolymers and of (co)polymers of one of the blocks in thin films comprising the following stages:

- synthesis of the block copolymer so that the product of the synthesis comprises the said block copolymer and a (co)polymer of one of the blocks,

- deposition of a solution of the blend of the block copolymer and of the (co)polymer on a surface,

- evaporation of the solvent,

- annealing.

In an aspect, there is provided a process for controlling the period characterizing the morphology obtained starting from a blend of block copolymers and of (co)polymers of one of the blocks in thin films and that decrease the defect of orientation, of coordination number or of distance of the said films comprising the following stages:

- synthesis of the block copolymer by anionic polymerization carried out batchwise for the synthesis of the first block and continuously using a micromixer for the

synthesis of the second block so that the product of the synthesis comprises the said block copolymer and a (co)polymer of one of the blocks, the proportion of the first active block being adjusted by adjustment of the temperature, or by the residence time, or through deactivating the first polymer block formed,

- deposition of a solution of the blend of the block copolymer and of the (co)polymer on a surface,

- evaporation of the solvent,

- annealing.

In another aspect, there is provided the use of the process as defined above to generate lithography masks.

~~In another aspect, there is provided a lithography mask obtained according to the use as defined above.~~

Detailed description:

Further to control the period, the present invention allows film fabrication with a minimum of orientation, coordination number or distance defect and with large monocrystalline surfaces.

The nanostructuring of a block copolymer of a surface treated by the process of the invention can take the forms such as cylindrical (hexagonal symmetry (*primitive hexagonal* lattice symmetry "*6 mm*") according to the

Claims

1. Process for controlling the period characterizing the morphology obtained starting from a blend of block copolymers and of (co)polymers of one of the blocks in thin films and that decrease the defect of orientation, of coordination number or of distance of the said films comprising the following stages:

- synthesis of the block copolymer by anionic polymerization carried out batchwise for the synthesis of the first block and continuously using a micromixer for the synthesis of the second block so that the product of the synthesis comprises the said block copolymer and a (co)polymer of one of the blocks, the proportion of the first active block being adjusted by adjustment of the temperature, or by the residence time, or through deactivating the first polymer block formed,

- deposition of a solution of the blend of the block copolymer and of the (co)polymer on a surface,

- evaporation of the solvent,

- annealing.

~~2 Process according to claim 1, with a minimum of defect of orientation, of coordination number or of distance and with large monocrystalline surfaces.~~

~~3. Process according to Claim 1 or 2, in which the synthesis is carried out by controlled radical polymerization.~~

~~4. Process according to Claim 1 or 2, in which the synthesis is carried out by anionic polymerization.~~

~~5. Process according to Claim 4, in which the polymerization is carried out batchwise for the synthesis of the first block and continuously using a micromixer for the synthesis of the second block.~~

~~6. Process according to Claim 5, in which the proportion of the first active block is adjusted by adjustment of the temperature.~~

~~7~~2. Process according to ~~one of~~ Claim~~s~~ 1 ~~to 6~~, additionally comprising a purification stage targeted at reducing the amount of (co)polymer.

~~8~~3. Process according to Claim 1 ~~or 2~~, in which the block copolymer is a diblock copolymer, the ratios by weight of the blocks of which are between 50/50 and 95/5.

~~9~~4. Process according to Claim 1 ~~or 2~~, in which the block copolymer/(co)polymer ratios are between 99/1 and 50/50.

~~10~~5. Process according to Claim 1 to Claim ~~9~~4, in which the blend of copolymers consists of a blend, on the one hand, of diblock copolymer, one of the blocks of which comprises styrene and the other block of which comprises methyl methacrylate, and, on the other hand, of a (co)polymer which comprises styrene.

~~11~~6. Process according to Claim ~~10~~5, in which the blend of copolymers consists of a blend of PS-b-PMMA diblock copolymer and of PS homopolymer.

~~12. Process according to Claim 11, in which the proportion of PS homopolymer is adjusted by a combination of the residence time and of the temperature.~~

~~13~~7. Process according to Claim 1 ~~or 2~~, in which the peak molecular weights of the block copolymer and of the

(co)polymer, taken separately, are between 2500 and 300 000 with a dispersity index of between 1.02 and 2.5.

~~14~~8. Process according to Claim 1 ~~or 2~~, in which the thickness of the film is greater than 40 nm and less than 400 nm.

~~15~~9. Process according to Claim 1 ~~or 2~~, in which the surface is free.

~~16~~10. Process according to Claim 1 ~~or 2~~, in which the surface exhibits guidance structures.

~~17~~11. Process according to Claim 1 ~~or 2~~, in which the annealing is carried out by a heat treatment.

~~18~~12. Process according to Claim 1 ~~or 2~~, in which the annealing is carried out by a treatment in solvent vapour.

~~19~~13. Process according to Claim 1 ~~or 2~~, in which the annealing is carried out by a combination of a heat treatment and of a solvent vapour treatment.

~~20~~14. Use of the process according to any one of the preceding claims to generate lithography masks.

~~21. Lithography mask obtained according to Claim 20.~~