CLAIMS

1. Method for fabricating a composite structure ~~(125; 225)~~ comprising a layer ~~(115; 215)~~ to be separated by irradiation, the method comprising the formation ~~(S10-S14; S110-S114)~~ of a stack containing at least:

- a support substrate ~~(105; 205)~~ formed from a material which is at least partially transparent at a determined wavelength;
- the layer ~~(115; 215)~~ to be separated; and
- a separation layer ~~(110; 210)~~ interposed between the support substrate and the layer to be separated, the separation layer being adapted to be separated by exfoliation under the action of radiation ~~(120; 220)~~ having a wavelength corresponding to the said determined wavelength,

the fabrication method being characterized in that it furthermore comprises, during the said step for forming the composite stack, at least one treatment step ~~(S10; S110)~~ modifying the optical properties in reflection at the interface ~~(106; 206)~~ between the said support substrate and the separation layer or on the upper face ~~(105a; 205a)~~ of the support substrate on the opposite side from the face of the said substrate in contact with the separation layer;

wherein the treatment step comprises the formation of at least one antireflection layer at the interface between the said support substrate and the separation layer and/or on the upper face of the support substrate; and

wherein, when an antireflection layer is formed at the interface between the support substrate and the separation layer, the composition of the antireflection layer varies gradually over its thickness so that its refractive index n2 is equal to n1 at its interface with the support substrate and is equal to n3 at its interface with the separation layer.

~~2. Method according to Claim 1, wherein the treatment step comprises the formation of at least one antireflection layer (106) at the interface between the said support substrate and the separation layer and/or on the upper face of the support substrate.~~

32. Method according to Claim ~~2~~1, wherein the refractive index n2 of the said antireflection layer ~~(106)~~ is substantially equal to $\sqrt{n1 \times n3}$, where n1 and n3 are respectively the refractive index of the support substrate and of the separation layer.

43. Method according to ~~any one of~~ Claims ~~1 to 3~~ or 2, wherein the separation layer comprises a heating sublayer and ~~a~~ an exfoliation sublayer,

the exfoliation sublayer being adapted to decompose under the action of heating induced by the heating sublayer.

54. Method according to Claim 43, wherein the support substrate consists of silicon, the heating sublayer consists of silicon dioxide, the exfoliation sublayer consists of Si_3N_4 and the antireflection layer consists of SiON, the refractive index of which is substantially equal to 2.61.

~~6. Method according to Claim 2, wherein, when an antireflection layer (106) is formed at the interface between the support substrate and the separation layer, the composition of the antireflection layer varies gradually over its thickness so that its refractive index n2 is equal to n1 at its interface with the support substrate and is equal to n3 at its interface with the separation layer.~~

75. Method according to Claim 61, wherein the separation layer comprises a heating sublayer consisting of silicon dioxide and an exfoliation sublayer consisting of Si_3N_4, the exfoliation sublayer being adapted to decompose under the action of heating induced by the heating sublayer, the support substrate consisting of silicon, and

wherein the composition of the antireflection layer consists of SiO_x, where x varies gradually between 0 and 2.

86. Method according to Claim 21, wherein, when an antireflection layer is formed on the upper face ~~(105a)~~ of the support substrate, the composition of the antireflection layer varies gradually over its thickness so that its refractive index n2 is equal to n1 at its interface with the support substrate and is equal to n0 at its upper surface on the opposite side from the said interface with the support substrate,

n0 being the refractive index of the medium in which the said composite structure is placed during the irradiation.

97. Method according to any one of Claims 1 to 86, wherein the thickness ~~(e1)~~ of the antireflection layer at the interface between the support substrate and the separation layer is substantially equal to

$(2M + 1) \cdot \lambda/4$, M being an odd integer greater than or equal to 0 and λ being the said determined wavelength.

~~108~~. Method according to any one of Claims 1 to ~~97~~, wherein the treatment step comprises the formation of at least one rough layer ~~(207)~~ at the interface ~~(206)~~ between the said support substrate ~~(205)~~ and the separation layer ~~(210)~~ and/or on the upper face ~~(205a)~~ of the support substrate, the rough layer having a mean roughness level greater than or equal to 50 Å rms over a measurement field equal to at least 3 times the dimension of the zone of the said upper face to be irradiated with the said radiation.

~~119~~. Method according to Claim ~~108~~, wherein the formation of the rough layer is carried out at least by mechanical grinding or chemical etching.

~~1210~~. Method for separating a layer from a structure as defined in any one of Claims 1 to ~~119~~, the method comprising irradiation of the separation layer through the support substrate of the said structure by means of incident light corresponding to the wavelength at which the support substrate is at least partially transparent, in order to induce weakening or separation by exfoliation of the said separation layer.

~~1311~~. Composite structure comprising a composite stack formed from at least:

- a support substrate formed from a material which is at least partially transparent at a determined wavelength;
- a layer to be separated by irradiation; ~~and~~
- a separation layer interposed between the support substrate and the layer to be separated, the separation layer being adapted to be separated by exfoliation under the action of radiation having a wavelength corresponding to the said determined wavelength, and
- at least one antireflection layer at the interface between the said support substrate and the separation layer and/or on an upper face of the support substrate,

the composite structure being characterized in that it furthermore comprises at least one layer modifying the optical properties in reflection at the interface between the said support substrate and the separation layer or on the upper face of the support substrate

on the opposite side from the face of the said substrate in contact with the separation layer;

wherein the composition of the antireflection layer varies gradually over its thickness so that its refractive index n2 is equal to n1 at its interface with the support substrate and is equal to n3 at its interface with the separation layer.

~~14~~12. Structure according to Claim ~~13~~11, wherein each layer modifying the optical properties in reflection corresponds respectively to an antireflection layer and/or to a rough layer having a mean roughness level greater than or equal to 50 Å rms over a field of 5 µm x 5 µm.

~~15~~13. Structure according to Claim ~~14~~12, wherein the said structure comprises at least one layer modifying the optical properties in reflection corresponding to an antireflection layer, and at least one layer modifying the optical properties in reflection corresponding to a rough layer.