Claims

1. A method of reproducing at least one single-walled carbon nanotube (3) having predefined electronic properties or a plurality of single-walled carbon nanotubes (3) having the same electronic properties, the method comprising the steps:

a) preparing a dispersion (2) from a liquid and from the at least one single-walled carbon nanotube (3) having predefined electronic properties or from the plurality of single-walled carbon nanotubes (3) having the same electronic properties;

b) forming fragments (6) of the at least one single-walled carbon nanotube (3) or of the plurality of single-walled carbon nanotubes (3) by an energy input into the dispersion (2);

c) applying the fragments (6) of the at least one single-walled carbon nanotube (3) or of the plurality of single-walled carbon nanotubes (3) from the dispersion (2) onto a surface (8) of a carrier (7) as a starting layer for reproducing and orienting the fragments (6) on the surface (8) during the application from the dispersion (2) so that the surface (8) is intersected by a longitudinal axis of the fragments (6) and the fragments (6) are not oriented in parallel in a plane with respect to the surface (8) of the carrier (7), wherein the fragments (6) are oriented by a self-organization on a gold layer which is applied to the surface (8) of the carrier (7) or a surfactant layer (9), which is formed by a surfactant comprised in the dispersion (2), the surfactant layer (9) having a thickness that is less than a length of the fragments (6) and is applied and dried on the surface (8) of the carrier (7) so that the fragments (6) of the at least one single-walled carbon nanotube (3) are applied and oriented on the dried surfactant layer (9) as well as fixed to the carrier (7) via the surfactant layer (9); and

d) introducing the fragments (6) applied to and oriented on the carrier (7) into an apparatus for chemical vapor deposition (9), with single-walled carbon nanotubes (3) having the same electronic properties being extended in the apparatus for chemical vapor deposition (9), starting from the fragments (6) serving as the starting layer, in a gas atmosphere containing carbon by means of chemical vapor deposition.

2. A method in accordance with claim 1, characterized in that the fragments (6) are formed by introduction of ultrasound into the dispersion (2), with fragments (6) having a length between 30 nm and 100 nm preferably being obtained.

3. A method in accordance with claim 2, characterized in that ultrasound is used having a power of 30 W to 100 W at a frequency between 20 kHz and 40 kHz.

4. A method in accordance with one of the preceding claims, characterized in that the fragments (6) are oriented on the surface (8) by application of an electrical field.

5. A method in accordance with one of the preceding claims 1 to 3, characterized in that $SH(CH_2)_nNH_2$ molecules are used for the orientation of the fragments (6) on the gold layer applied to the surface (8) of the carrier (7).

6. A method in accordance with one of the preceding claims, characterized in that the longitudinal axis of the applied fragments (6) has an angle with respect to the surface between 60° and 120°, preferably between 75° and 105°, particularly preferably between 80° and 100°, with the carrier (7) preferably being a silicon oxide substrate.

7. A method in accordance with one of the preceding claims, characterized in that plasma-assisted chemical vapor deposition is used to extend the carbon nanotubes (6).

8. A method in accordance with one of the preceding claims, characterized in that the carbon nanotubes (3) used for reproduction have the same diameter and the same chirality.

9. A method in accordance with one of the preceding claims, characterized in that the dispersion (2) is prepared from water, preferably from distilled water, and from a surface-active substance, preferably a surfactant, for producing a homogeneous dispersion.

10. A method in accordance with one of the preceding claims, characterized in that the produced carbon nanotubes (3) having the same electronic properties are removed from the carrier (7) and the method is carried out again using these removed carbon nanotubes (3) for a further reproduction of the carbon nanotubes (3).

11. A method in accordance with one of the preceding claims, characterized in that the single-walled carbon nanotubes are formed with a diameter between 0.6 nm and 2 nm.

12. A method in accordance with one of the preceding claims, characterized in that the reproduced carbon nanotubes (3) are measured with respect to their properties by optical absorption spectroscopy, Raman spectroscopy and/or a photoluminescence measurement after the growing by chemical vapor deposition and carbon nanotubes (3) differing from the desired properties are separated.

13. A method in accordance with one of the preceding claims, characterized in that the carbon nanotubes (3) are manufactured with a packing density of up to 10,000 carbon nanotubes per μm^2, preferably of up to 20.000 carbon nanotubes per μm^2, and particularly preferably of up to 40,000 carbon nanotubes per μm^2.

14. A method in accordance with one of the preceding claims, characterized in that the carbon nanotubes (3) and/or the fragments (6) of the carbon nanotubes (3) are arranged on the carrier (7) with a spacing from one another of less than 0.5 µm.

15. A carrier (7) having a surface (8) on which single-walled carbon nanotubes (3) having the same electronic properties are applied such that a longitudinal axis of the carbon nanotubes (3) intersects the surface (8) and the carbon nanotubes (3) are not oriented in parallel in a plane with respect to the surface (8) of the carrier (7) and
a dried surfactant layer (9) having a thickness that is less than a length of the fragments (6) is applied to the surface (8) and the fragments (6) of the at least one single-walled carbon nanotube (3) are applied to,

oriented on and fixed with it or
the surface (8) of the carrier (7) is provided with a gold layer and the fragments (6) of the at least one single-walled carbon nanotube (3) are applied to and oriented on it.

16. A carrier (7) having a surface (8) on which fragments (6) of the at least one single-walled carbon nanotube (3) are applied and are oriented such that a longitudinal axis of the fragments (6) of the at least one carbon nanotube (3) intersects the surface (8) and the fragments (6) of the at least one carbon nanotube (3) are not oriented in parallel in a plane with respect to the surface (8) of the carrier (7) and
a dried surfactant layer (9) having a thickness that is less than a length of the fragments (6) is applied to the surface (8) and the fragments (6) of the at least one single-walled carbon nanotube (3) are applied to, oriented on and fixed with it or
the surface (8) of the carrier (7) is provided with a gold layer and the fragments (6) of the at least one single-walled carbon nanotube (3) are applied to and oriented on it.

17. A carrier (7) in accordance with claim 15, characterized in that the surface (8) of the carrier (7) being provided with the gold layer is provided with a layer of $SH(CH_2)_nNH_2$ molecules for the orientation.