Claims

1. Method for producing a gas sensor (2) comprising a step of providing a substrate (4) with two coplanar electrodes (6) and a step of forming a ZnO nanowires network (8) on said two electrodes, characterized in that the step of forming a ZnO nanowires network on said two electrodes is performed as follows:
    a. synthesizing ZnO nanowires with a liquid phase sequential growth method;
    b. dispersing said synthetized nanowires in a solvent;
    c. drop casting the solution containing the solvent and the ZnO nanowires on the electrodes;
    d. drying the solution at a temperature inferior to 85°C.
2. Method according to claim 1, characterized in that step a) of synthesizing ZnO nanowires comprises the sub-steps of subsequently:
    a. preparing a solution of zinc chloride and hexamethylenetetramine dissolved into water, wherein zinc chloride and hexamethylenetetramine are equimolar;
    b. heating the solution at a temperature comprised between 70° and 90°C~~, preferably 85°C~~;
    c. adding every 100 min, equimolar amounts of zinc chloride and hexamethylenetetramine into said solution while keeping heating.
3. Method according to any one of claims 1 and 2, characterized in that step a of synthesizing ZnO nanowires is performed under stirring~~, preferably at 350 rpm~~.
4. Method according to any one of claims 2 and 3, characterized in that sub-step c is repeated at least one time~~, preferably two times~~.
5. Method according to any one of claims 1 to 4, characterized in that step c of drop casting comprises depositing a droplet of 50 µL of the ZnO nanowires solution on the electrodes.
6. Method according to any one of claims 1 to 5, characterized in that steps c of drop casting and d of drying are repeated together at least one time~~, preferably two times~~.
7. Gas sensor (2) comprising a substrate (4), two electrodes (6) on said substrate, a ZnO nanowires network (8) on said two electrodes, characterized in that the ZnO nanowires network forms junctions between said ZnO nanowires, the ZnO nanowires network comprising HMTA, NH_3, NH^{4+} and/or NH_x at said junctions.
8. Gas sensor according to claim 7, characterized in that the electrodes (6) are in metal~~, preferably in gold~~.
9. Gas sensor according to any one of claims 7 and 8, characterized in that each ZnO nanowire has a length superior to 0.5 µm and/or inferior to 20 µm, ~~preferably equals to 3 µm~~ and a diameter superior to 20 nm and/or inferior to 500 nm~~, preferably equals to 250 nm~~.
10. Gas sensor (2) according to any one of claims 7 to 9, characterized in that each electrode (6) has a thickness superior to 10 nm and/or inferior to 200 nm,~~ preferably equal to 50 nm~~.
11. Gas sensor (2) according to any one of claims 7 to 10, characterized in that each electrode (6) has a length comprised between 2 µm and 5000 µm, preferably comprised between 1000 µm and 1100 µm~~, more preferably equals to 1050 µm~~.

12. Gas sensor (2) according to any one of claims 7 to 11, characterized in that the electrodes (6) are interdigitated.

13. Gas sensor (2) according to claim 12, characterized in that the interdigitated electrodes (6) have interdigitated fingers (10), the fingers being spaced with each other with a gap (g) comprised 2 and 100 µm, preferably equals to 20 µm.

14. Use of a gas sensor (2) to detect O_2 and/or CO_2 characterized in that the gas sensor (2) is according to any one of claims 7 to 13.

15. Use according to claim 14, characterized in that the detection is carry out at a temperature comprised between 0° and 100 °C.