Claims

1. A disposable photometric measurement tip comprising;
a polymer tip, the polymer tip having ;
a capillary filling channel, the capillary filing channel having an opening at a distal end of the polymer tip,
a wave guide channel acting as an optical input coupling and
a wave guide channel acting as an optical output coupling,
each of the wave guide channels having an opening at a proximal end of the polymer tip
wherein the capillary filling channel, the wave guide channel acting as an optical input coupling and the wave guide channel acting as an optical output coupling are connected to each other.

2. A disposable photometric measurement tip according to claim 1 wherein the polymer tip has a length between 0.5 and 10 centimeter.

3. A disposable photometric measurement tip according to claim 1 or claim 2 wherein the polymer tip has a diameter between 50 micrometer to 10 milimeter at its capillary filling channel end.

4. A disposable photometric measurement tip according to any one of the preceding claims wherein the tip has a diameter between 1 millimeter and 20 milimeter at its optical coupling end.

5. A disposable photometric measurement tip according to any one of the preceding claims wherein the polymer tip is formed of a polymer material having a refractive index lower than 1.33.

6. A disposable photometric measurement tip according to any one of the preceding claims wherein the polymer tip has a film or coating with low refractive index applied onto the inner wall of the waveguide channel acting as a cladding.

7. A disposable photometric measurement tip according to any one of the preceding claims wherein the polymer tip has a microstructured surface forming a two-dimensional periodic array or structure of air holes or air filled regions which is applied onto the inner wall of the waveguide channel and exhibiting a photonic bandgap effect and acting as a cladding.

8. A disposable photometric measurement tip according to any one of the preceding claims wherein the capillary channel and the waveguide channel have a cross section between 1 micrometer square and 1 milimeter square.

9. A disposable photometric measurement tip according to any one of the preceding claims wherein the cross section of the capillary filling channel and the wave guide channel is different.

10. A disposable photometric measurement tip according to any one of the preceding claims wherein at least one of the cross section of the capillary filling

~~channel and the cross section of the wave guide channel changes over the channel length.~~

~~11. A disposable photometric measurement tip according to any one of the preceding claims wherein the wave guide channel has a meander or folded shape such that the length of the wave guide channel is a multiple of the tip length.~~

~~12. A disposable waveguide according to claim 11 wherein the multiple is less than 1000.~~

~~13. A disposable photometric measurement tip according to any one of the preceding claims wherein the capillary filling channel and the wave guide channel are the same.~~

~~14. A disposable photometric measurement tip according to any one of the preceding claims wherein the opening of the wave guide channel acting as the optical input coupling and the opening of the wave guide channel acting as the optical output coupling are the same.~~

~~15. A disposable photometric measurement tip according to any one of the preceding claims wherein the dimensions and bending angles of the wave guide channel are selected to only guide light of a particular wave length interval.~~

~~16. A disposable photometric measurement tip according to claim 15 wherein the dimensions and bending angles of the wave guide channel are selected to only guide light of one wavelength.~~

~~17. A disposable photometric measurement tip according to any one of the preceding claims wherein the dimensions and bending angles of the wave guide channel are selected to only guide light above a particular refractive index.~~

~~18. A disposable photometric measurement tip according to any one of the preceding claims wherein the tip has more than one waveguide channel.~~

~~19. A disposable photometric measurement tip according to any one of the preceding claims wherein at least one prism and or at least one reflective surface is used to guide the light.~~

~~20. A disposable photometric measurement tip according to any one of the preceding claims wherein the capillary filling channel has an integrated filter.~~

~~21. A disposable photometric measurement tip according to any one of the preceding claims having one wave guide channel acting as an optical input coupling connected to more than one wave guide channel acting as an optical output coupling.~~

~~22. A disposable photometric measurement tip according to any one of the preceding claims having one wave guide channel acting as an optical output~~

coupling connected to more than one wave guide channel acting as an optical input coupling.

23. A disposable photometric measurement tip according to any one of the preceding claims wherein the tip contains a reagent which is mixed with the sample filling up the channels.

24. A disposable photometric measurement tip according to claim 23 wherein the tip comprises a reservoir cavity containing at least one reagent and wherein the reservoir cavity is connected to at least one channel.

25. A system for performing photometric measurements, the system comprising;

a disposable photometric tip according to any one of the preceding claims, a light source connected to the wave guide channel acting as an optical input coupling and

a light detector connected to the wave guide channel acting as an optical output coupling.

26. A system according to claim 25, the system being operable to perform photometric or fluorometric or turbidimetric or nephleometric or refractive index measurements.

27. A method of performing photometric measurements using the system of claim 25 or claim 26, the method comprising the steps of:

supplying light from the light source to the wave guide channel acting as an optical input coupling,

immersing the distal end of the tip into a liquid sample such that liquid is drawn into the capillary filling channel and the waveguide channel, and

detecting transmitted light at the light detector.

1. A disposable photometric measurement tip comprising;

a polymer tip (d), the polymer tip having;

a capillary filling channel (g), the capillary filling channel having an opening (h) at a distal end of the polymer tip, a distal end of the capillary filling channel having a diameter in the range 1 mm to 500 mm to provide a capillary filling mechanism,

a wave guide channel acting as an optical input coupling (b) and a wave guide channel acting as an optical output coupling (c), each of the wave guide channels having a separate opening at a proximal end of the polymer tip, the waveguide channels being adapted to function as waveguide when they are filled with a sample, wherein the capillary filling channel, the wave guide channel acting as an optical input coupling and the wave guide channel acting as an optical output coupling are connected to each other.

2. A disposable photometric measurement tip according to claim 1, wherein the polymer tip has a length between 0.5 and 10 centimeter, and/or wherein the polymer tip has a diameter between 50 micrometer to 10 millimeter at its capillary filling channel end, and/or wherein the tip has a diameter between 1 millimeter and 20 millimeter at its optical coupling end.

3. A disposable photometric measurement tip according to claim 1 or claim 2, wherein the polymer tip (d) is formed of a polymer material having a refractive index lower than 1.33, and/or wherein the polymer tip has a film or coating with low refractive index applied onto the inner wall of the waveguide channel acting as a cladding, and/or wherein the polymer tip has a micro-structured surface forming a two-dimensional periodic array or structure of air holes or air-filled regions which is applied onto the inner wall of the waveguide channel and exhibiting a photonic bandgap effect and acting as a cladding.

4. A disposable photometric measurement tip according to any one of the preceding claims, wherein the waveguide channel have a cross section between 1 micrometer square and 1 millimeter square, and/or wherein the cross-section of the capillary filling channel and the wave guide channel is different, and/or wherein at least one of the cross-section of the capillary filling

channel and the cross section of the wave guide channel changes over the channel length.

5. A disposable photometric measurement tip according to any one of the preceding claims, wherein the wave guide channel has a meander or folded shape such that the length of the wave guide channel is a multiple of the tip length, preferably wherein the multiple is less than 1000.

6. A disposable photometric measurement tip according to any one of the preceding claims, wherein the capillary filling channel and the wave guide channel are the same.

7. A disposable photometric measurement tip according to any one of the preceding claims, wherein the opening of the wave guide channel acting as the optical input coupling (b) and the opening of the wave guide channel acting as the optical output coupling (c) are the same.

8. A disposable photometric measurement tip according to any one of the preceding claims, wherein the wave guide channel contains liquid water and the dimensions and bending angles of the wave guide channel are selected to only guide light of a wave length of 260 nm to 700 nm, preferably wherein the dimensions and bending angles of the wave guide channel are selected to only guide light of one wavelength.

9. A disposable photometric measurement tip according to claim 8, wherein the dimensions and bending angles of the wave guide channel are selected to only guide light above a refractive index of 1.33.

10. A disposable photometric measurement tip according to any one of the preceding claims, wherein the tip (d) has more than one waveguide channel, and/or wherein at least one prism and or at least one reflective surface is used to guide the light, and/or wherein the capillary filling channel has an integrated filter.

11. A disposable photometric measurement tip according to any one of the preceding claims having one wave guide channel acting as an optical input coupling (b) connected to more than one wave guide channel acting as an optical output coupling (c).

12. A disposable photometric measurement tip according to any one of the preceding claims having one wave guide channel acting as an optical output coupling (c) connected to more than one wave guide channel acting as an optical input coupling (b).

13. A disposable photometric measurement tip according to any one of the preceding claims, wherein the tip contains a reagent which is mixed with the sample filling up the channels, preferably wherein the tip comprises a reservoir cavity containing at least one reagent and wherein the reservoir cavity is connected to at least one channel.

14. A system for performing photometric measurements, the system comprising;
a disposable photometric tip (d) according to any one of the preceding claims,
a light source connected to the wave guide channel acting as an optical input coupling (b), and
a light detector connected to the wave guide channel acting as an optical output coupling (c).

15. A method of performing photometric measurements using the system of claim 14, the method comprising the steps of:
supplying light from the light source to the wave guide channel acting as an optical input coupling (b),
immersing the distal end of the tip (d) into a liquid sample such that liquid is drawn into the capillary filling channel (g) and the waveguide channel, and
detecting transmitted light at the light detector.