

CLAIMS

1. A system, comprising:

a catheter device, comprising:

an introducer needle, wherein the introducer needle (12) comprises a distal tip (14), an elongated tubular shaft (16), and an inner lumen (18) formed by the elongated tubular shaft (16), wherein the distal tip (14) comprises a beveled edge configured for blood to travel into;

a catheter tube, wherein a distal tip of the catheter tube is proximal to the distal tip (14) of the introducer needle;

an optical fiber (10) disposed within the inner lumen (18) of the introducer needle, wherein the optical fiber (10) comprises a first end (20), a second end (22), and a U-shaped portion (24) disposed between the first and the second end (22), wherein a distal most portion of the U-shaped portion (24) is disposed proximal to the beveled edge,

a light emitter coupled with the first end (20) of the optical fiber (10);
a light receiver coupled with the second end (22) of the optical fiber (10), wherein the light receiver is configured to convert light into an electrical signal;

and

an electronic processor coupled with the light receiver, wherein the electronic processor is configured to detect a decrease in an intensity of

the light received at the light receiver based on the electrical signal,

wherein the optical fiber (10) is configured to contact blood in response to insertion of the introducer needle into a blood vessel, wherein the

decrease in the intensity of light occurs in response to the optical fiber (10) contacting the blood.

2. The system of claim 1, wherein the optical fiber (10) is a homogenous optical fiber (10).
3. The system of claim 1, wherein the first end (20) and the second end (22) are twisted with respect to each other to form a helical shape.
4. The system of claim 1, wherein the U-shaped portion (24) of the optical fiber (10) is configured to contact air prior to insertion of the introducer needle (12) into a blood vessel.
5. The system of claim 1, further comprising an alarm, wherein the alarm is configured to sound in response to detecting the decrease in the intensity of the light received at the light receiver.
6. The system of claim 5, wherein the alarm is reusable, wherein the optical fiber (10) is disposable and configured to be separated from the alarm at an optical connector disposed at a proximal end of a catheter device that comprises the introducer needle (12).
7. The system of claim 1, wherein the first end (20) and the second end (22) of the optical fiber (10) extend through at least a portion of the catheter device.
8. The system of claim 7, further comprising:
wherein the U-shaped portion (24) is disposed proximate the distal tip (14) of the introducer needle (12).
9. The system of claim 8, wherein the U-shaped portion (24) of the optical fiber (10) is configured to contact the blood when the introducer needle (12) is inserted in the blood vessel.
10. The system of claim 1, wherein the optical fiber (10) is planar.
11. The system of claim 10, wherein the first end (20) and the second end (22) are twisted with respect to each other.

12. The system of claim 7, further comprising an alarm, wherein the alarm is configured to sound in response to detecting of the decrease in the intensity of the light received at the light receiver.
13. The system of claim 7, further comprising, a catheter adapter, wherein the catheter adapter comprises a catheter tube, and wherein the U-shaped portion (24) is disposed within an outer wall of the catheter tube.