

The claims:

1. A device for interstitial laser therapy comprising:
an optical waveguide extending about a central longitudinal axis and having an optical output end;
an optical diffuser optically coupled to the optical output end, wherein the optical diffuser comprises a housing having an open end for receiving the optical output end and a first longitudinal portion of the optical waveguide; and
a first temperature sensor interposed between the central longitudinal axis and an exterior surface of the housing within the longitudinal extent of the first longitudinal portion of the optical waveguide.
2. The device of claim 1, wherein the first temperature sensor is interposed between the first longitudinal portion of the optical waveguide and the housing.
3. The device of claim 1 or 2, wherein the housing is a tubular housing.
4. The device of claim 3, wherein an outer diameter of the housing is approximately equal to an outer diameter of the optical waveguide.
5. The device of claim 3, wherein an inner diameter of the housing is approximately equal to an outer diameter of the optical waveguide.
6. The device of any one of claims 1 to 5, wherein the optical diffuser is provided with one or more holes, one or more slits, one or more openings, and/or one or more vents.
7. The device of claim 6, wherein gases generated during use escape out from an inside region of the optical diffuser via the one or more holes, the one or more slits, the one or more openings, and/or the one or more vents.
8. The device of any one of claims 1 to 7, wherein the housing comprises polytetrafluoroethylene (PTFE).

9. The device of any one of claims 1 to 8, wherein the first temperature sensor is a micro-temperature sensor.
10. The device of any one of claims 1 to 9, wherein the first temperature sensor is an integrated temperature sensor.
11. The device of any one of claims 1 to 10, wherein the first temperature sensor is a thermocouple.
12. The device of any one of claims 1 to 10, wherein the first temperature sensor is an infrared temperature sensor.
13. The device of any one of claims 1 to 12, wherein the first temperature sensor is adapted to measure a first temperature external to the optical diffuser.
14. The device of any one of claims 1 to 13, wherein the optical waveguide comprises an inner layer and an outer layer, wherein the outer layer radially surrounds the inner layer.
15. The device of claim 14, wherein the optical waveguide is an optical fibre.
16. The device of claim 15, wherein the inner layer comprises a core layer and a cladding layer, and wherein the cladding layer radially surrounds the core layer.
17. The device of any one of claims 14 to 16, wherein the optical output end is stripped of the outer layer.
18. The device of claim 17, wherein the optical output end has a longitudinal length between about 1 mm and about 2 mm.
19. The device of any one of claims 14 to 18, wherein the first longitudinal portion of the optical waveguide is at least partially stripped of the outer layer for accommodating the first temperature sensor.

20. The device of any one of claims 1 to 19, wherein the device further comprises a second temperature sensor, attached to the optical waveguide.
21. The device of claim 20, wherein the second temperature sensor is fixed within a second longitudinal portion of the optical waveguide.
22. The device of claim 20 or 21, wherein the second temperature sensor is arranged adjacent to the open end of the optical diffuser.
23. The device of any one of claims 20 to 22, wherein the first temperature sensor and the second temperature sensor are longitudinally offset by between about 4 mm to about 6 mm.
24. The device of any one of claims 20 to 23, wherein the first temperature sensor and the second temperature sensor are adapted to measure a temperature difference.
25. The device of any one of claims 20 to 24, wherein the second temperature sensor is adapted to measure a second temperature external to the optical diffuser.
26. The device of any one of claims 1 to 25, wherein the central longitudinal axis does not intersect with the first temperature sensor and/or the second temperature sensor.
27. The device of any one of claims 1 to 26, wherein the first temperature sensor and/or the second temperature sensor are/is positioned apart from the optical output end.
28. The device of any one of claims 1 to 27, wherein the first temperature sensor is positioned adjacent to or abutting an internal surface of the optical diffuser.
29. The device of any one of claims 1 to 28, wherein the second temperature sensor is positioned outside the longitudinal extent of the optical diffuser.
30. A system for interstitial laser therapy comprising:

the device of any one of claims 1 to 29;
a power-tunable optical source optically coupled to the optical waveguide; and
a processing system configured to:
 obtain a temperature measurement from the first temperature sensor; and
 adjust an optical output power of the optical source.

31. A system for interstitial laser therapy comprising:
the device of any one of claims 20 to 29;
a power-tunable optical source optically coupled to the optical waveguide; and
a processing system configured to:
 obtain temperature measurements from the first temperature sensor and
 from the second temperature sensor; and
 adjust an optical output power of the optical source.
32. The system of claim 30 or 31, wherein the system further includes a channel for delivering the device to a treatment region.
33. The system of claim 32, wherein at least an end portion of the channel is transparent or semi-opaque.
34. The system of claim 32 or 33, wherein the channel is a catheter or a cannula.
35. The system of any one of claims 30 to 34, wherein the system further includes an ultrasound scanner for locating the device.