focal line viewed along a beam propagation direction, directing the laser beam focal line into the material at a first location, the laser beam focal line generating an induced absorption within the material, the induced absorption producing a damage track along the laser beam focal line within the material, translating the material and the pulsed laser beam relative to each other starting from the first location along a first closed contour, thereby producing a plurality of damage tracks along the first closed contour within the material, and directing a focused CO_2 laser into the material around a second closed contour contained within the first closed contour to facilitate removal of an inner plug of the material along the first closed contour.

[0005] There is also disclosed a method of laser drilling a material includes focusing a pulsed laser beam into a laser beam focal line, viewed along the beam propagation direction, directing the laser beam focal line into the material at a first

CLAIMS

1. A method of laser processing a material comprising:

focusing a pulsed laser beam into a laser beam focal line viewed along a beam propagation direction;

directing the laser beam focal line into the material at a first location, the laser beam focal line generating an induced absorption within the material, the induced absorption producing a damage track along the laser beam focal line within the material;

translating the material and the pulsed laser beam relative to each other starting from the first location along a first closed contour, thereby producing a plurality of damage tracks along the first closed contour within the material; and

directing a focused CO_2 laser into the material around a second closed contour contained within the first closed contour to facilitate removal of an inner plug of the material along the first closed contour.

2. The method of claim 1, further comprising:

directing the laser beam focal line into the material at a second location, the laser beam focal line generating an induced absorption within the material, the induced absorption producing a damage track along the laser beam focal line within the material at the second location; and

translating the material and the pulsed laser beam relative to each other starting from the second location along a third closed contour, thereby producing a plurality of damage tracks along the third closed contour within the material, the third closed contour contained within the first closed contour, wherein directing the laser beam focal line into the material at the second location and translating the material and the pulsed laser beam relative to each other along the third closed contour each occur before directing the focused CO_2 laser into the material around the second closed contour contained within the first closed contour.

3. The method of claim 2, wherein the second closed contour is contained between the first closed contour and the third closed contour.

4. The method of any one of claims 1 to 3, further comprising directing an assist gas toward the material and collinear with the CO_2 laser beam.

5. The method of any one of claims 1 to 4, wherein removal of the inner plug defines an opening in the material, the opening comprising a width between 0.5 mm and 100 mm.

14. A glass article made by the method of claim 7, wherein:

the glass article comprises an opening in the glass material, the opening comprising a width between 0.5 mm and 100 mm;

a depth of subsurface damage along an unpolished edge of the opening is less than or equal to 75 μm within the glass material; and

an Ra surface roughness along the unpolished edge surface is less than or equal to 0.5 μm.

15. The glass article of claim 14, wherein the glass article comprises ion exchanged glass.