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1. (Currently Amended) A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises:

a center electrode having an inner surface, an end and at least a portion of the center electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

wherein the insulator is between the center electrode and the shell electrode and at least a portion of the insulator is uncovered by the center electrode and the shell electrode;

wherein a chamfered portion of the insulator is adjacent to the uncovered portion of the insulator, and the chamfered potion mates with a chamfered potion of the inner surface of the center electrode and with a chamfered portion of the inner surface of the shell electrode such that the center electrode and the shell electrode are positioned and electrically insulated from each other such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode, wherein the spark gap is located on a radial facing surface.

2. (Original) The spark igniter of claim 1, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than 8% of the outer surface perimeter of the body.

3. (Original) The spark igniter of claim 1, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than or equal to 5% of the perimeter of the inner surface of the shell electrode measured at the second edge.

4. (Currently Amended) The spark igniter of claim 1, wherein ~~the spark gap is located on an axial facing surface~~ at least one of the ends forms at least one of the first edge and the second edge of the spark gap and wherein at least a portion of at least one end does not contact the insulator.

5. (Canceled)

6. (Canceled)

~~7~~ 5. (Currently Amended) A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises:

a center electrode having an inner surface, an end and at least a portion of the center electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

wherein the insulator is between the center electrode and the shell electrode and at least a portion of the insulator is uncovered by the center electrode and the shell electrode such that the center electrode and the shell electrode are positioned and electrically insulated from each other such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode, ~~The spark igniter of claim 6,~~ wherein a semiconductor material is applied to the uncovered portion of the insulator such that said semiconductor has a non-uniform coverage of the uncovered portion of the insulator by the semiconductor material being [[~~is~~]] applied in stripes such that at least an area of the uncovered portion of the insulator is without a semiconductor material.

~~8~~6. (Currently Amended) The spark igniter of claim [[~~1~~]] 5, wherein at least one of the first edge and the second edge has a non-uniform geometric shape.

~~9~~7. (Original) The spark igniter of claim ~~8~~ 6, wherein at least one of the first edge and the second edge has a non-uniform geometric shape comprising any one from a group consisting of a star, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, and decagon.

~~10~~8. (Currently Amended) The spark igniter of claim [[~~1~~]] 5, wherein a chamfered portion of the insulator is adjacent to the uncovered portion of the insulator, and the chamfered portion mates with a chamfered portion of the inner surface of the center electrode and with a chamfered portion of the inner surface of the shell electrode ~~at least one of the ends forms at least one of the first edge and the second edge of the spark gap and wherein at least a portion of at least one end does not contact the insulator~~.

~~11~~9. (Original) A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises

a center electrode having an inner surface, an end and at least a portion of the center electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

wherein the insulator is between the center electrode and the shell electrode and at least a portion of the insulator is uncovered by the center electrode and the shell electrode such that the center electrode and the shell electrode are positioned and electrically insulated from each other such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode; and

wherein at least one of the first edge and the second edge of the spark gap has a non-uniform geometric shape.

~~12~~10. (Original) The spark gap igniter of claim ~~11~~ 9, wherein the spark gap is located on an axial facing portion of the outer surface of the body and the first edge has the non-uniform geometric shape and the shape comprises any one from a group consisting of a star, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, and decagon.

~~13~~11. (Original) The spark igniter of claim ~~11~~ 9, wherein the spark gap is located on an axial facing portion of the outer surface of the body and the second edge has the non-uniform geometric shape, the shape comprising any one from a group consisting of a star, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, decagon.

~~14~~12. (Original) The spark igniter of claim ~~11~~ 9, wherein the spark gap is located on a radial facing portion of the outer surface of the body and the non-uniform shape is such that a portion of at least one of the first edge and the second edge does not contact the insulator.

~~15~~13. (Original) The spark igniter of claim ~~11~~ 9, wherein a semiconductor material is applied to the uncovered portion of the insulator at the spark gap such that said semiconductor has a non-uniform coverage of the uncovered portion of the insulator.

~~16~~14. (Original) The spark igniter of claim ~~15~~ 13, wherein the semiconductor material is applied in stripes such that at least an area of the uncovered portion of the insulator is without a semiconductor material.

~~17~~15. (Original) The spark igniter of claim ~~11~~ 9, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than 8% of the outer surface perimeter of the body.

~~18~~16. (Original) The spark igniter of claim ~~11~~ 9, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than or equal to 5% of the perimeter of the inner surface of the shell electrode measured at the second edge.

~~19~~17. (Currently Amended) A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises

a center electrode having an inner surface and an end and at least a portion of the ~~shell~~ center electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

the insulator is positioned between the center electrode and the shell electrode, wherein at least a portion of the insulator is uncovered by the center electrode and the shell electrode such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode;

wherein the depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than 8% of the outer surface perimeter of the body.

~~20~~18. (Original) The spark igniter of claim ~~19~~ 17, wherein the depth is less than or equal to 5% of the perimeter of the inner surface of the shell electrode measured at the second edge.

~~21~~19. (Original) The spark igniter of claim ~~19~~ 17, wherein a portion of insulator adjacent to the uncovered portion of the insulator extends to a chamfered portion, which mates

with a chamfered portion of the inner surface of the center electrode and with a chamfered portion of the inner surface of the shell electrode.

~~22~~20. (Original) The spark igniter of claim ~~19~~ 17, wherein a semiconductor material is applied to the uncovered portion of the insulator such that said semiconductor has a non-uniform coverage of the uncovered portion of the insulator.

~~23~~21. (Original) The spark igniter of claim ~~22~~ 20, wherein the semiconductor material is applied in stripes such that at least an area of the uncovered portion of the insulator is without a semiconductor material.

CLAIMS

1. A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises:

a center electrode having an inner surface, an end and at least a portion of the center electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

wherein the insulator is between the center electrode and the shell electrode and at least a portion of the insulator is uncovered by the center electrode and the shell electrode;

wherein a chamfered portion of the insulator is adjacent to the uncovered portion of the insulator, and the chamfered potion mates with a chamfered potion of the inner surface of the center electrode and with a chamfered portion of the inner surface of the shell electrode such that the center electrode and the shell electrode are positioned and electrically insulated from each other such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode.

2. The spark igniter of claim 1, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than 8% of the outer surface perimeter of the body.

3. The spark igniter of claim 1, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than or equal to 5% of the perimeter of the inner surface of the shell electrode measured at the second edge.

4. The spark igniter of claim 1, wherein the spark gap is located on an axial facing surface.

5. The spark igniter of claim 1, wherein the spark gap is located on a radial facing surface.

6. The spark igniter of claim 1, wherein a semiconductor material is applied to the uncovered portion of the insulator such that said semiconductor has a non-uniform coverage of the uncovered portion of the insulator.

7. The spark igniter of claim 6, wherein the semiconductor material is applied in stripes such that at least an area of the uncovered portion of the insulator is without a semiconductor material.

8. The spark igniter of claim 1, wherein at least one of the first edge and the second edge has a non-uniform geometric shape.

9. The spark igniter of claim 8, wherein at least one of the first edge and the second edge has a non-uniform geometric shape comprising any one from a group consisting of a star, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, and decagon.

10. The spark igniter of claim 1, wherein at least one of the ends forms at least one of the first edge and the second edge of the spark gap and wherein at least a portion of at least one end does not contact the insulator.

11. A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises

a center electrode having an inner surface, an end and at least a portion of the center electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

wherein the insulator is between the center electrode and the shell electrode and at least a portion of the insulator is uncovered by the center electrode and the shell electrode such that the center electrode and the shell electrode are positioned and electrically insulated from each other such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode; and

wherein at least one of the first edge and the second edge of the spark gap has a non-uniform geometric shape.

12. The spark gap igniter of claim 11, wherein the spark gap is located on an axial facing portion of the outer surface of the body and the first edge has the non-uniform geometric shape and the shape comprises any one from a group consisting of a star, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, and decagon.

13. The spark igniter of claim 11 wherein the spark gap is located on an axial facing portion of the outer surface of the body and the second edge has the non-uniform geometric shape, the shape comprising any one from a group consisting of a star, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, decagon.

14. The spark igniter of claim 11, wherein the spark gap is located on a radial facing portion of the outer surface of the body and the non-uniform shape is such that a portion of at least one of the first edge and the second edge does not contact the insulator.

15. The spark igniter of claim 11, wherein a semiconductor material is applied to the uncovered portion of the insulator at the spark gap such that said semiconductor has a non-uniform coverage of the uncovered portion of the insulator.

16. The spark igniter of claim 15, wherein the semiconductor material is applied in stripes such that at least an area of the uncovered portion of the insulator is without a semiconductor material.

17. The spark igniter of claim 11, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than 8% of the outer surface perimeter of the body.

18. The spark igniter of claim 11, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than or equal to 5% of the perimeter of the inner surface of the shell electrode measured at the second edge.

19. A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises

a center electrode having an inner surface and an end and at least a portion of the shell electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

the insulator is positioned between the center electrode and the shell electrode, wherein at least a portion of the insulator is uncovered by the center electrode and the shell

electrode such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode;

wherein the depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than 8% of the outer surface perimeter of the body.

20. The spark igniter of claim 19, wherein the depth is less than or equal to 5% of the perimeter of the inner surface of the shell electrode measured at the second edge.

21. The spark igniter of claim 19, wherein a portion of insulator adjacent to the uncovered portion of the insulator extends to a chamfered portion, which mates with a chamfered portion of the inner surface of the center electrode and with a chamfered portion of the inner surface of the shell electrode.

22. The spark igniter of claim 19, wherein a semiconductor material is applied to the uncovered portion of the insulator such that said semiconductor has a non-uniform coverage of the uncovered portion of the insulator.

23. The spark igniter of claim 22, wherein the semiconductor material is applied in stripes such that at least an area of the uncovered portion of the insulator is without a semiconductor material.

CLAIMS

1. A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises:

a center electrode having an inner surface, an end and at least a portion of the center electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

wherein the insulator is between the center electrode and the shell electrode and at least a portion of the insulator is uncovered by the center electrode and the shell electrode;

wherein a chamfered portion of the insulator is adjacent to the uncovered portion of the insulator, and the chamfered potion mates with a chamfered potion of the inner surface of the center electrode and with a chamfered portion of the inner surface of the shell electrode such that the center electrode and the shell electrode are positioned and electrically insulated from each other such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode, wherein the spark gap is located on a radial facing surface.

2. The spark igniter of claim 1, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than 8% of the outer surface perimeter of the body.

3. The spark igniter of claim 1, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than or equal to 5% of the perimeter of the inner surface of the shell electrode measured at the second edge.

4. The spark igniter of claim 1, wherein at least one of the ends forms at least one of the first edge and the second edge of the spark gap and wherein at least a portion of at least one end does not contact the insulator.

5. A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises:

a center electrode having an inner surface, an end and at least a portion of the center electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

wherein the insulator is between the center electrode and the shell electrode and at least a portion of the insulator is uncovered by the center electrode and the shell electrode such that the center electrode and the shell electrode are positioned and electrically insulated from each other such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode, wherein a semiconductor material is applied to the uncovered portion of the insulator such that said semiconductor has a non-uniform coverage of the uncovered portion of the insulator by the semiconductor material being applied in stripes such that at least an area of the uncovered portion of the insulator is without a semiconductor material.

6. The spark igniter of claim 5, wherein at least one of the first edge and the second edge has a non-uniform geometric shape.

7. The spark igniter of claim 6, wherein at least one of the first edge and the second edge has a non-uniform geometric shape comprising any one from a group consisting of a star, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, and decagon.

8. The spark igniter of claim 5, wherein a chamfered portion of the insulator is adjacent to the uncovered portion of the insulator, and the chamfered portion mates with a chamfered portion of the inner surface of the center electrode and with a chamfered portion of the inner surface of the shell

9. A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises

a center electrode having an inner surface, an end and at least a portion of the center electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

wherein the insulator is between the center electrode and the shell electrode and at least a portion of the insulator is uncovered by the center electrode and the shell electrode such that the center electrode and the shell electrode are positioned and electrically insulated from each other such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode; and

wherein at least one of the first edge and the second edge of the spark gap has a non-uniform geometric shape.

10. The spark gap igniter of claim 9, wherein the spark gap is located on an axial facing portion of the outer surface of the body and the first edge has the non-uniform geometric shape and the shape comprises any one from a group consisting of a star, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, and decagon.

11. The spark igniter of claim 9, wherein the spark gap is located on an axial facing portion of the outer surface of the body and the second edge has the non-uniform geometric shape, the shape comprising any one from a group consisting of a star, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, decagon.

12. The spark igniter of claim 9, wherein the spark gap is located on a radial facing portion of the outer surface of the body and the non-uniform shape is such that a portion of at least one of the first edge and the second edge does not contact the insulator.

13. The spark igniter of claim 9, wherein a semiconductor material is applied to the uncovered portion of the insulator at the spark gap such that said semiconductor has a non-uniform coverage of the uncovered portion of the insulator.

14. The spark igniter of claim 13, wherein the semiconductor material is applied in stripes such that at least an area of the uncovered portion of the insulator is without a semiconductor material.

15. The spark igniter of claim 9, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than 8% of the outer surface perimeter of the body.

16. The spark igniter of claim 9, wherein a depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than or equal to 5% of the perimeter of the inner surface of the shell electrode measured at the second edge.

17. A spark igniter comprising:

a plurality of electrodes and an insulator, which are configured to form a body having an outer surface;

the plurality of electrodes comprises

a center electrode having an inner surface and an end and at least a portion of the center electrode forms at least part of the outer surface of the body; and

a shell electrode having an inner surface, an end and at least a portion of the shell electrode forms at least part of the outer surface of the body;

the insulator is positioned between the center electrode and the shell electrode, wherein at least a portion of the insulator is uncovered by the center electrode and the shell electrode such that a spark gap is formed from a first edge of the center electrode and a second edge of the shell electrode;

wherein the depth of the spark gap is measured from the uncovered portion of the insulator to the outer surface of the body and wherein the depth is less than 8% of the outer surface perimeter of the body.

18. The spark igniter of claim 17, wherein the depth is less than or equal to 5% of the perimeter of the inner surface of the shell electrode measured at the second edge.

19. The spark igniter of claim 17, wherein a portion of insulator adjacent to the uncovered portion of the insulator extends to a chamfered portion, which mates with a chamfered portion of the inner surface of the center electrode and with a chamfered portion of the inner surface of the shell electrode.

20. The spark igniter of claim 17, wherein a semiconductor material is applied to the uncovered portion of the insulator such that said semiconductor has a non-uniform coverage of the uncovered portion of the insulator.

21. The spark igniter of claim 20, wherein the semiconductor material is applied in stripes such that at least an area of the uncovered portion of the insulator is without a semiconductor material.