SUMMARY OF INVENTION

[0009a] An aspect of the present disclosure provides a method of creating a fragmentation pattern on a warhead. The method includes applying a photosensitive material coating to an interior surface of a warhead casing, selectively curing a portion of the photosensitive material with light radiation according to a predefined fragmentation pattern, and removing the uncured portion of the photosensitive material.

[0010] There is also disclosed a method of creating a fragmentation pattern on a warhead comprising ablating material from the interior surface of the warhead according to a pre-defined fragmentation pattern. The pre-defined fragmentation pattern may be effected electronically or with a mask. The ablation may be effected by applying an etchant to the warhead interior surface material.

[0011] A method for etching a fragmentation pattern into a warhead may comprise the steps of applying a photosensitive material coating, such as a photoresist, to an interior surface of a warhead casing, exposing a portion of the photosensitive material coating corresponding to the positive image of the fragmentation pattern to light radiation thereby curing the exposed portion of the photosensitive material coating, removing the unexposed portion of the photosensitive material coating with a photosensitive material removal process such as a chemical wash and applying an etchant material to the interior of the warhead casing thereby etching the negative image of the fragmentation pattern into the interior surface to create a sufficient differential natural stress raiser in the presence of an explosive blast wave.

[0012] A method for creating a fragmentation pattern on a warhead comprises the steps of applying a photosensitive material resist coating, such as a photoresist, to an interior surface of a warhead casing, exposing a portion of the photosensitive material coating corresponding to the positive image of the fragmentation pattern to light radiation thereby curing the exposed portion of the photosensitive material coating, removing the unexposed portion of the photosensitive material coating with a photosensitive material removal process such as a chemical wash and depositing an additive stress protection material to the interior of the warhead casing thereby covering the cured positive image fragmentation pattern portion of the photosensitive material to create a sufficient differential natural stress raiser in the presence of an explosive blast wave.

CLAIMS

1. A method of creating a fragmentation pattern on a warhead, comprising

applying a photosensitive material coating to an interior surface of a warhead casing;

selectively curing a portion of the photosensitive material with light radiation according to a predefined fragmentation pattern; and

removing the uncured portion of the photosensitive material.

2. The method as claimed in claim 1, wherein the photosensitive material is employed which, when cured, creates a differential natural stress raiser in the presence of an explosive blast, without the need for etching.

3. The method as claimed in claim 1, further comprising:

applying an etchant to the interior surface of the warhead casing, thereby etching the predefined fragmentation pattern into the interior surface of the warhead to create a differential natural stress riser in the presence of an explosive blast.

4. The method as claimed in claim 3, wherein the etchant is acidic or basic.

5. The method as claimed in claim 3 or 4 and wherein the etchant is Nital (alcohol and nitric acid).

6. The method of claim 1, wherein the portion of the photosensitive material exposed to light radiation corresponds to a positive image of the fragmentation pattern and the uncured portion of the photosensitive material corresponds to a negative image of the fragmentation pattern.

7. The method of claim 1, wherein the portion of the photosensitive material exposed to light radiation corresponds to a negative image of the fragmentation pattern and the uncured portion of the photosensitive material corresponds to a positive image of the fragmentation pattern.

8. The method of any one of claims 1 to 7, wherein the photosensitive material is selected from one of the following: a photoresist material and a light cure resin based polymer material.

9. The method of any one of claims 1 to 8, wherein the step of applying the photosensitive material coating to the interior surface of the warhead casing further

comprises the step of inserting a photosensitive material applicator into an opening of the warhead casing.

10. The method of claim 9, wherein the applicator is a spray device.

11. The method of claim 9, wherein the applicator is a brush or roller device.

12. The method of claim 1, wherein the photosensitive material coating is applied via vapour deposition.

13. The method of claim 1, wherein the photosensitive material is applied by dipping.

14. The method of claim 1, wherein the step of exposing a portion of the photosensitive material coating corresponding to the fragmentation pattern to light radiation further comprises the step of inserting a light source into an opening of the warhead casing.

15. The method of claim 14, wherein the light source further comprises a mask for blocking the transmission of light through the portions of the mask.

16. The method of claim 15, wherein the mask is overlaid on the light source and sized and dimensioned to produce a light pattern on the interior surface of the warhead corresponding to the desired positive image of the fragmentation pattern.

17. The method of claim 15, wherein the mask is overlaid on the interior surface of the warhead.

18. The method of any one of claims 14 to 17, wherein the light source emits light over 360 degrees.

19. The method of any one of claims 14 to 17, wherein the light source rotates around the interior cavity of the warhead to incrementally expose the interior surface.

20. The method of claim 1, wherein the light radiation is ultraviolet light radiation.

21. The method of claim 1, wherein the photosensitive material removal process is a chemical wash.

22. The method of claim 1, wherein the photosensitive material removal process is ionic.

23. The method of any one of claims 1 to 22, further comprising the step of depositing a protective coating over the warhead interior surface.

24. The method of claim 23, wherein the protective coating is a metal coating applied via a laser powder forming or cold spray process.

25. The method of claim 23 or claim 24, wherein the protective coating comprises steel.

26. The method of any one of the preceding claims, comprising as a precursor step at least one of:

cleaning the interior surface of the warhead casing;

dehydrating the interior surface of the warhead casing; and

applying an adhesive promoter to the interior surface of the warhead casing.

27. The method of any one of the preceding claims, wherein after formation of the fragmentation pattern the warhead is filled with explosive.

28. The method of claims 2 or 3, wherein the depth differential between a stress raiser and the warhead interior surface is between 1.0 and 4.0 mm.

29. The method of claim 28, wherein the depth differential is 1.25mm.

30. The method of any one of the preceding claims and arranged to provide a rectangular, bow tie, helix, triangular or diamond shaped fragmentation pattern.

31. The method of any one of the preceding claims, wherein the warhead casing comprises HF-1 Steel.