What we claim:

1. A method for corrosion mitigation on a component having at least one damaged portion, the method comprising:

applying a coating on a surface of the at least one damaged portion of the component, the coating comprising a reactive rare-earth-doped oxide, wherein the reactive rare-earth-doped-oxide is gadolinium doped ceria; and

initiating a reaction between the coating and molten sulfates comprising sulfur containing compounds and aerosols at the surface of the at least one damaged portion, the reaction catalytically decomposing the molten sulfates at the surface of the at least one damaged portion of the component.

2. The method according to claim 1, further comprises the step of curing the coating on the surface of the at least one damaged region locally.

3. The method of claim 1, further comprises the step of masking the component to restrict applying the coating to the at least one damaged portion.

4. The method of claim 1, further comprising the step of preparing the at least one damaged portion of the component to retain the coating.

5. The method of claim 4, wherein the step of preparing comprises at least one of sanding and grit blasting.

6. The method of claim 1, wherein the coating is less than or equal to 1.0 mils thick.

7. The method of claim 1, further comprising the step of altering a viscosity of the coating depending on a predetermined application method.

8. The method of claim 7, wherein the predetermined application method comprises at least one of spraying and brushing.

9. The method of claim 1, wherein the coating operating temperature ranges from 500ºC to 982ºC.

10. A method for corrosion mitigation on a component having at least one damaged portion, the method comprising:

applying a coating on a surface of the at least one damaged portion, the coating comprising a reactive rare-earth-doped-oxide, wherein the reactive rare-earth-doped-oxide is gadolinium doped ceria; and

initiating a reaction between the coating and molten sulfates comprising sulfur containing compounds and aerosols at the surface of the at least one damaged portion, the reaction catalytically decomposing the molten sulfates at the surface of the at least one damaged portion of the component.

11. The method according to claim 10, further comprises the step of curing the coating on the surface of the at least one damaged portion locally.

12. The method of claim 10, wherein the component is masked to restrict an application of the reactive rare-earth-doped-oxide coating to the at least one damaged portion of the component.

13. The method of claim 10, wherein the at least one damaged portion of the component is prepared for proper adhesion of the reactive rare-earth-doped-oxide coating to the component.

14. The method of claim 13, wherein the component is prepared for proper adhesion comprise at least one of sand papering and grip blasting.

15. The method of claim 10, wherein the coating is less than or equal to 1.0 mils thick.

16. The method of claim 10, further comprises the step of varying a viscosity of the coating to be coordinated with a predetermined application method.

17. The method of claim 16, wherein the predetermined application method comprises at least one of brushing and spraying.