an oxidised polymer substrate; and

a reduced graphene oxide laminate membrane;

wherein the reduced graphene oxide laminate membrane is formed from the reduction of the corresponding graphene oxide laminate membrane with a reducing agent which does not generate CO_2 or CO when it reduces graphene oxide and/or wherein reduction of the corresponding graphene oxide laminate with the reducing agent leads to the oxygen originating from the graphene oxide being substantially or exclusively expelled as water;

wherein the oxidised polymer substrate has a higher oxygen content than a corresponding polymer that has not been oxidised,

wherein the reduced graphene oxide laminate membrane has a thickness from 30nm to 500nm.

22. The barrier material of claim 21, wherein the oxidised polymer is oxidised PET.

23. A reduced graphene oxide laminate membrane, wherein the reduced graphene oxide membrane is affixed to a metal substrate and an adhesion promoter is dispersed throughout the reduced graphene oxide laminate and/or or between the reduced graphene oxide laminate and the substrate and wherein the reduced graphene oxide laminate membrane is formed from the reduction of the corresponding graphene oxide laminate membrane with a reducing agent which does not generate CO_2 or CO when it reduces graphene oxide and/or wherein reduction of the corresponding graphene oxide laminate with the reducing agent leads to the oxygen originating from the graphene oxide being substantially or exclusively expelled as water.

24. A membrane of claim 23, wherein the adhesion promoter is a polymer.

25. A membrane of claim 24, wherein the polymer is PVA.

26. A membrane of claim 23, wherein the adhesion promoter is phytic acid. e.g. PMMA, PVA, polystyrene, poly(4-styrenesulfonate), Nafion, carboxymethyl cellulose, Chitosan, polyvinyl pyrrolidone, polyaniline.

27. A reduced graphene oxide laminate membrane, wherein the reduced graphene oxide membrane is affixed to a glass or silicon based substrate and an adhesion promoter is dispersed throughout the reduced graphene oxide laminate and/or or between the reduced graphene oxide laminate and the substrate and wherein the reduced graphene oxide laminate membrane is formed from the reduction of the corresponding graphene oxide laminate membrane with a reducing agent which does not generate CO_2 or CO when it reduces graphene oxide and/or wherein reduction of the corresponding graphene oxide

laminate with the reducing agent leads to the oxygen originating from the graphene oxide being substantially or exclusively expelled as water.

28. A membrane of claim 27, wherein the adhesion promoter is sodium metasilicate.

29. A membrane or barrier material of any one of claims 21 to 28, wherein the reducing agent is selected from HI, HBr and ascorbic acid.