CLAIMS

1. A process for the dehydrogenation of at least one dehydrogenatable hydrocarbon, the process comprising contacting a feed comprising the at least one dehydrogenatable hydrocarbon under dehydrogenation conditions with a catalyst composition comprising a support and a dehydrogenation component comprising at least one metal component selected from platinum and palladium, wherein said conditions include a temperature of from 400°C to 750°C and a pressure of at least 50 psig (345 kPag), the catalyst composition has an oxygen chemisorptions of greater than 30%.

2. The process of claim 1, wherein the at least one dehydrogenatable hydrocarbon is an alicyclic compound.

3. The process of claim 1, wherein the at least one dehydrogenatable hydrocarbon is cyclohexanone.

4. The process of any one of claims 1 to 3, wherein said temperature is at least 450°C.

5. The process of any one of claims 1 to 4, wherein said temperature is at least 460°C.

6. The process of any one of the preceding claims, wherein said temperature is at least 470°C.

7. The process of any one of the preceding claims, wherein said temperature is at least 500°C.

8. The process of any one of the preceding claims, wherein said temperature is at least 550°C.

9. The process of any one of the preceding claims, wherein said pressure is at least 75 psig (517 kPag).

10. The process of any one of the preceding claims, wherein said pressure is at least 90 psig (621 kPag).

~~11. The process of any one of the preceding claims, wherein said catalyst composition has an oxygen chemisorption of greater than 30%.~~

~~12.~~11. The process of any one of the preceding claims, wherein the catalyst composition has an oxygen chemisorption of greater than 50%.

~~13.~~12. The process of any one of the preceding claims, wherein the catalyst composition has an oxygen chemisorption of greater than 70%.

~~14.~~13. The process of any one of the preceding claims, wherein the support is selected from the group consisting of silica, a silicate, an aluminosilicate, zirconia, carbon, and carbon nanotubes.

~~15.~~14. The process of any one of the preceding claims, wherein the support comprises silica.

~~16. The process of any one of the preceding claims, wherein the dehydrogenation component is at least one metal component selected from platinum and palladium.~~

~~17.~~15. The process of any one of the preceding claims, wherein the dehydrogenation component is a metal component comprising platinum.

~~18.~~16. The process of any one of the preceding claims, wherein the catalyst composition is capable of dehydrogenating the dehydrogenatable hydrocarbon at a conversion of 95% or more.

~~19.~~17. The process of any of the preceding claims, wherein said conditions further include introducing hydrogen to the process.

~~20.~~18. The process of any of the preceding claims, wherein said catalyst composition further comprises an inorganic base component comprising at least one metal component selected from Group 1 and Group 2 of the Periodic Table of Elements wherein said at least one metal component selected from Group 1 and Group 2 of the Periodic Table of Elements is present in an amount of at least 0.1 wt%.

~~21.~~19. The process of claim 20, wherein the inorganic base component is at least one metal component selected from potassium, cesium and rubidium.

~~22.~~20. The process of claim 20, wherein the inorganic base component is a metal component comprising potassium.

~~23.~~21. The process of any one of the preceding claims, wherein said catalyst composition comprises: (i) a support; and (ii) the dehydrogenation component comprising at least one metal component selected from Groups 6 to 10 of the Periodic Table of Elements~~; and (iii) a inorganic base component comprising at least one metal component selected from Group 1 and Group 2 of the Periodic Table of Elements; wherein said at least one metal component selected from Group 1 and Group 2 of the Periodic Table of Elements is present in an amount of at least 0.1 wt%~~.

~~24.~~22. A process for producing phenol, the process comprising:

(a) oxidizing cyclohexylbenzene to produce cyclohexylbenzene hydroperoxide;

(b) converting at least a portion of cyclohexylbenzene hydroperoxide from (a) to produce an effluent stream comprising phenol and cyclohexanone; and

(c) contacting at least a portion of said effluent stream with a catalyst composition comprising a support, a dehydrogenation component comprising at least one metal component selected from ~~Groups 6 to 10 of the Periodic Table of Elements~~ platinum and palladium and an inorganic base component comprising at least one

metal component selected from Group 1 and Group 2 of the Periodic Table of Elements under dehydrogenation conditions effective to convert at least at least a portion of the cyclohexanone in said feed into phenol and hydrogen;

wherein said dehydrogenation conditions include a temperature of at least 450°C and a pressure of at least 90 psig (621 kPag), the catalyst composition has an oxygen chemisorptions of greater than 30%.

~~25.~~23. The process of claim ~~24~~ 22 wherein the at least a portion of said effluent stream in said contacting (c) has the same composition as the effluent stream produced in said converting (b).