60 min; and the HP 5890 GC ramp was set to: -30°C for 5 min, 5°C/min to 80°C for 2 min, 5°C/min to 200°C for 0 min, 15°C/min to 240°C held to the end total analysis time of 60 min.

[00112] The results of the cyclohexanone testing of the catalysts of Examples 1 to 9 are summarized in the accompanying drawings.

[00113] Figure 1 show that presence of Sn at 1 wt% in a calcined 1 wt%Pt/SiO_2 catalyst, both with and without the presence of 0.5 wt% K (Examples 9B and 8, respectively) resulted in lower catalyst activity and higher catalyst deactivation compared to the catalyst of Comparative Example 1 without Sn. This is illustrated with reference to conversion of cyclohexanone (CHO). However, a dramatic decrease in the pentane formation was observed (Figure 2). When 0.10 wt% Sn was added to the Pt/support without and with calcination, Examples 2A and 2B, the data show that this approach improves the catalyst activity and higher cyclohexanone conversion was obtained. The calcined sample of Example 2B shows better stability than the non-calcined sample of Example 2A and the K/Pt catalyst of Comparative Example 1 (Figure 3). The calcined sample of Example 2B also shows better selectivity to phenol than the non-calcined sample of Example 2A (Figure 4), but its pentane selectivity is higher than the Pt/K catalyst of Comparative Example 1 (Figure 5).

[00114] The data show that the addition sequence of the Pt and Sn did not affect the catalyst activity and stability, both catalysts showing similar cyclohexanone conversion and similar catalyst deactivation. Thus, the calcined 0.1%Sn/1%Pt/SiO_2 catalyst of Example 2B and the calcined 1%Pt/0.1%Sn/SiO_2 catalyst of Example ~~8~~ 4 show similar improvement in the catalyst activity and stability as compared with the Pt/K catalyst of Comparative Example 1 (Figure 6). Unexpectedly, however, the Sn addition sequence dramatically affects the pentane formation. Thus, as shown in Figure 7, when the Sn was added first then the Pt as in Example ~~8~~ 4, the catalyst showed reduced pentane production and pentylbenzene was below GC detection limit as compared to the catalyst of Example 2B, where Pt was added to the support first then the Sn. Similarly, Figure 8 shows that better selectivity to phenol was observed with the catalyst of Example ~~8~~ 4 (Sn added first) as compared to the catalyst of Example 2B (Pt added first).

[00115] Figure 9 demonstrates the addition of Sn in amounts in excess of 0.15 wt% has a deleterious effect on catalyst stability and activity. Both 0.05 wt% and 0.1 wt% Sn catalyst showed similar catalyst deactivation.

[00116] Figure 10 demonstrates that catalysts which contain < 0.25 wt% Sn show similar phenol selectivity, whereas Figure 11 demonstrates that increasing the Sn content lowers the

CLAIMS

1. A catalyst composition comprising: (i) a support; (ii) a dehydrogenation component comprising at least one metal or compound thereof selected from Groups 6 to 10 of the Periodic Table of Elements; and (iii) tin or a tin compound, wherein the tin is present in an amount of 0.01 wt% to 0.25 wt%, the wt% based upon the total weight of the catalyst composition, further wherein the catalyst composition is prepared by sequential impregnation with the tin or tin compound being applied to the support before the dehydrogenation component, and further wherein the catalyst composition contains less than 0.1 wt% cobalt.

2. The catalyst composition of claim 1, wherein the tin is present in an amount of 0.05 wt% to 0.25 wt%, based upon the total weight of the catalyst composition.

3. The catalyst composition of claim 1 or claim 2, wherein the catalyst composition contains no cobalt.

4. The catalyst composition of claim 3, wherein the support is selected from the group consisting of silica, a silicate, an aluminosilicate, zirconia, carbon, and carbon nanotubes.

5. The catalyst composition of claim 3 or claim 4, wherein the dehydrogenation component comprises at least one of platinum, palladium and compounds thereof.

6. The catalyst composition of any one of claims 3-5, wherein the dehydrogenation component is present in an amount of greater than 0.01 wt% to 2 wt%, based upon the total weight of the catalyst composition.

~~7. The catalyst composition of any one of the preceding claims, wherein the composition provides a reduced selectivity to one or more of pentane, pentene and carbon monoxide.~~

~~8.~~7. A method for preparing a catalyst composition, the method comprising:

(a) treating a support with tin or a compound thereof;

(b) heating the treated support at a temperature of 100°C to 700°C; and

(c) impregnating the support with a dehydrogenation component comprising at least one metal or compound thereof selected from Groups 6 to 10 of the Periodic Table of Elements,

wherein the impregnating (c) is effected after the treating (a); and

wherein the final catalyst composition contains less than 0.1 wt% cobalt.

~~9.~~8. The method of claim ~~8~~ 7, wherein the heating (b) is conducted in an oxygen-containing atmosphere.

~~10.~~9. The method of claim ~~8~~ 7 or claim ~~9~~ 8, and further comprising:

(d) heating the impregnated support at a temperature of 100°C to 700°C.

~~11.~~10. The method of claim ~~10~~ 9, wherein the heating (d) is conducted in an oxygen-containing atmosphere at a temperature of 200°C to 500°C for a time of 1 to 10 hours.

~~12.~~11. The method of any one of claims ~~10-11~~ 9-10, wherein the heating (d) is conducted in an oxygen-containing atmosphere at a temperature of 300°C to 450°C for a time of 1 to 10 hours.

~~13.~~12. The method of any one of claims ~~8-12~~ 7-11, wherein the final catalyst composition contains no cobalt.

~~14.~~13. The method of claim ~~13~~ 12, wherein the treating (a) comprises treating the support with a tin compound in an amount sufficient to provide greater than 0.01 wt% to 0.25 wt% of tin based upon the total weight of the final catalyst composition.

~~15.~~14. The method of claim ~~13~~ 12 or claim ~~14~~ 13, wherein the treating (a) comprises treating the support with a tin compound in an amount sufficient to provide 0.05 wt% to 0.25 wt% of tin based upon the total weight of the final catalyst composition.

~~16.~~15. The method of any one of claims ~~13-15~~ 12-14, wherein the treating (a) comprises treating the support with a tin compound in an amount sufficient to provide 0.05 wt% to 0.15 wt% of tin based upon the total weight of the final catalyst composition.

~~17.~~16. The method of any one of claims ~~13-16~~ 12-15, wherein the support is selected from the group consisting of silica, a silicate, an aluminosilicate, zirconia, carbon, and carbon nanotubes.

~~18.~~17. The method of any one of claims ~~13-17~~ 12-16, wherein the dehydrogenation component comprises at least one of platinum, palladium and compounds thereof.

~~19.~~18. The method of any one of claims ~~13-18~~ 12-17, wherein the support is impregnated with the dehydrogenation component in an amount sufficient to provide 0.01 wt% to 2 wt%, based upon the total weight of the final catalyst composition.

~~20.~~19. The method of any one of claims ~~13-18~~ 12-17, wherein the support is impregnated with the dehydrogenation component in an amount sufficient to provide 0.5 wt% to 1.5 wt%, based upon the total weight of the final catalyst composition.

~~21.~~20. A process for the dehydrogenation of a ketone to an aromatic alcohol, the process comprising contacting a feed comprising a cycloaliphatic alcohol or ketone under dehydrogenation conditions with catalyst composition comprising: (i) a support; (ii) a dehydrogenation component comprising at least one metal or compound thereof selected from Groups 6 to 10 of the Periodic Table of Elements; and (iii) tin or a tin compound, wherein the tin is present in an amount of 0.01 wt% to 0.25 wt%, the wt% based upon the total weight of the catalyst composition, further wherein the catalyst composition is prepared by sequential impregnation with the tin or tin compound being applied o the support before the dehydrogenation component.

~~22.~~21. The process of claim ~~21~~ 20, wherein said feed comprises cyclohexanone.

~~23.~~22. The process of claim ~~21~~ 20 or claim ~~22~~ 21, wherein said dehydrogenation conditions comprise a temperature of 250°C to 500°C, a pressure of 100 kPa to 3550 kPa, a weight hourly space velocity of 0.2 hr^{-1} to 50 hr^{-1}, and a hydrogen to cyclohexanone-containing feed molar ratio of 2 to 20.

~~24.~~23. The process of any one of claims ~~21–23~~ 20-22, wherein said at least one metal selected from Groups 6 to 10 of the Periodic Table of Elements comprises platinum, palladium and mixtures thereof.

~~25.~~24. A process for producing phenol from benzene, the process comprising:

(a) reacting benzene and hydrogen with a catalyst under hydroalkylation conditions to produce cyclohexylbenzene;

(b) oxidizing cyclohexylbenzene from (a) to produce cyclohexylbenzene hydroperoxide;

(c) converting cyclohexylbenzene hydroperoxide from (b) to produce an effluent steam comprising phenol and cyclohexanone; and

(d) contacting at least a portion of the effluent stream from (c) with a dehydrogenation catalyst comprising: (i) a support; (ii) a dehydrogenation component comprising at least one metal or compound thereof selected from Groups 6 to 10 of the Periodic Table of Elements; and (iii) tin or a tin compound, wherein the tin is present in an amount of 0.01 wt% to 0.25 wt%, the wt% based upon the total weight of the catalyst composition, and further wherein the catalyst composition is prepared by sequential impregnation with the tin or tin compound being applied to the support before the dehydrogenation component;

wherein the contacting occurs under dehydrogenation conditions effective to convert at least part of the cyclohexanone in the effluent stream into phenol and hydrogen.