CLAIMS

I claim:

1. A catalyst system for heterogeneous catalysis of an ~~organic compound conversion reaction~~ isobutylene polymerization reaction to form a polyisobutylene product, ~~said~~ the catalyst system comprising a reaction product of (i) a BF_3/alcohol catalyst complex and (ii) an ~~activated metal oxide~~ alumina support for said catalyst complex, ~~said reaction product including an amount of said catalyst complex effective for catalyzing said conversion reaction~~a concentration of said catalyst complex on said alumina support ranges between 10 to 30% by weight, a ratio of the alcohol to the BF_3 in said catalyst complex ranges between 0.5 mole of the alcohol per mole of BF_3 to 2 moles of the alcohol per mole of BF_3.

2. The~~A~~ catalyst system ~~as set forth in~~ of claim 1, wherein ~~said~~ the ~~conversion~~ isobutylene polymerization reaction comprises Friedel-Crafts alkylation, phenolic alkylation, olefin dimerization, olefin oligomerization, olefin polymerization, propylene oligomerization, propylene polymerization, butylene dimerization, butylene oligomerization, isobutylene dimerization, isobutylene oligomerization, butylene polymerization, isobutylene polymerization or isoparaffin alkylation.

~~3. A catalyst system as set forth in claim 1, wherein said alcohol has no alpha hydrogen.~~

~~4. A catalyst system as set forth in claim 3, wherein said alcohol comprises a C_1—C_{10} monohydric alcohol, glycol or polyhydric alcohol.~~

~~5. A catalyst system as set forth in claim 1, wherein said alcohol is methanol.~~

~~6. A catalyst system as set forth in claim 5, wherein the concentration of said catalyst complex on the alumina ranges from about 10 to about 30 % by weight.~~

~~7~~3. ~~A~~ The catalyst system ~~as set forth in~~of claim ~~6~~1, wherein the concentration of said catalyst complex on the alumina support ranges from about 25 to about 30 % by weight.

~~8~~4. ~~A~~ The catalyst system ~~as set forth in~~of claim 1, wherein ~~said~~ the catalyst system is ~~in the form of~~ a fixed bed.

~~9. A catalyst system as set forth in claim 1, wherein said conversion reaction comprises polymerization of isobutylene to form a polyisobutylene product.~~

~~10~~5. ~~A~~ The catalyst system ~~as set forth in~~ of claim 1, wherein ~~said activated metal oxide~~ the alumina support comprises gamma alumina.

~~11. A catalyst system as set forth in claim 5, wherein the ratio of alcohol to BF_3 in said catalyst complex ranges from about 0.5 mole of alcohol per mole of BF_3 to about 2 moles of alcohol per mole of BF_3.~~

~~12~~6. ~~A~~ The catalyst system ~~as set forth in~~ of claim ~~11~~1, wherein the ratio of alcohol to BF_3 in ~~said~~ the catalyst complex ranges from about 1 mole of alcohol per mole of BF_3 to about 1.3 moles of alcohol per mole of BF_3.

~~13. A catalyst system for heterogeneous catalysis of an isobutylene polymerization reaction, said system comprising a reaction product of (i) a BF_3/methanol catalyst complex and (ii) a gamma alumina support for said catalyst complex, wherein the ratio of alcohol to BF_3 in said catalyst complex ranges from about 0.5 mole of alcohol per mole of BF_3 to about 2 moles of alcohol per mole of BF_3, wherein the concentration of said catalyst complex on the alumina ranges from about 10 to about 30 % by weight.~~

~~14. A catalyst system as set forth in claim 13, wherein said system is in the form of a fixed bed.~~

~~15. A method for preparing a catalyst system for heterogeneous catalysis of an organic compound conversion reaction, said method comprising reacting (i) a BF_3/alcohol catalyst complex and (ii) an activated metal oxide support for said catalyst complex, wherein said reaction product includes an amount of said catalyst complex effective for catalyzing said conversion reaction.~~

~~16. A method as set forth in claim 15, wherein said alcohol has no alpha hydrogen.~~

~~17. A method as set forth in claim 16, wherein said alcohol is methanol.~~

~~18. A method as set forth in claim 15, wherein the concentration of said catalyst complex on the alumina ranges from about 10 to about 30 % by weight.~~

~~19. A method as set forth in claim 15, wherein said conversion reaction comprises polymerization of isobutylene to form a polyisobutylene product.~~

~~20. A method as set forth in claim 15, wherein said activated metal oxide support comprises gamma alumina.~~

21. A method as set forth in claim 15, wherein the ratio of alcohol to BF_3 in said catalyst complex ranges from about 0.5 mole of alcohol per mole of BF_3 to about 2 moles of alcohol per mole of BF_3.

22. A method for preparing a catalyst system for heterogeneous catalysis of an isobutylene polymerization reaction, said method comprising reacting (i) a BF_3/methanol catalyst complex and (ii) a gamma alumina support for said catalyst complex, wherein the ratio of alcohol to BF_3 in said catalyst complex ranges from about 0.5 mole of alcohol per mole of BF_3 to about 2 moles of alcohol per mole of BF_3, wherein the concentration of said catalyst complex on the alumina ranges from about 10 to about 30 % by weight.

23. A method for conducting an organic compound conversion reaction comprising contacting a selected reactive organic compound with a catalyst system as set forth in claim 1.

24. A method as set forth in claim 23, wherein said system is in the form of a fixed bed.

25. A method for conducting an isobutylene polymerization reaction comprising contacting isobutylene with a catalyst system as set forth in claim 13.

26. A method as set forth in claim 25, wherein said system is in the form of a fixed bed.