CLAIMS

1 A catalyst comprising a modified silica support, the modified silica support comprising a modifier metal, and a catalytic metal on the modified silica support, wherein the modifier metal is selected from one or more of zirconium and/or hafnium, characterised in that at least a proportion, typically, at least 25%, of the said modifier metal is present in modifier metal moieties having a total of up to 2 modifier metal atoms.

2. A catalyst comprising a modified silica support, the modified silica support comprising a modifier metal, and a catalytic metal on the modified silica support, wherein the modifier metal is selected from one or more of zirconium and/or hafnium, characterised in that at least a proportion, typically, at least 25%, of the said modifier metal is present in modifier metal moieties derived from a monomeric and/or dimeric modifier metal cation source at the commencement of the modification.

3. A modified silica support for a catalyst comprising a silica support and a modifier metal wherein the modifier metal is selected from one or more of zirconium and/or hafnium, characterised in that at least a proportion, typically, at least 25%, of the said modifier metal is present in modifier metal oxide moieties having a total of up to 2 modifier metal atoms.

4. A modified silica support for a catalyst comprising a silica support and a modifier metal, wherein the modifier metal is selected from one or more of zirconium and/or hafnium characterised in that at least a proportion, typically, at least 25%, of the said modifier metal is present in modifier metal oxide moieties derived from a monomeric and/or dimeric modifier metal cation source at the commencement of the modification.

5. A modified silica support or catalyst according to any preceding claim, wherein the modifier metal is an adsorbate adsorbed on the silica support surface, preferably, chemisorbed thereon.

6. A modified silica support or catalyst according to any of claims 1, 2 or 5, wherein the modifier metal moieties are modifier metal oxide moieties.

7. A modified silica support or catalyst according to any preceding claim, wherein the silica support is in the form of a silica gel, more typically, a xerogel or a hydrogel.

22. A method of producing a modified silica support for a catalyst comprising the steps of:-

i. providing a silica support with isolated silanol groups and optionally treating the said support to provide isolated silanol groups (-SiOH) at a level of <2.5 groups per nm^2;

ii. contacting the optionally treated silica support with a monomeric zirconium or hafnium modifier metal compound to effect adsorption of the said modifier metal onto the support, to at least 25% of the said isolated silanol groups;

iii. optionally, removing any solvent or liquid carrier for the modifier metal compounds;

iv. optionally calcining the modified support for a time and temperature sufficient to convert the monomeric zirconium or hafnium compound adsorbed on the surface to an oxide or hydroxide of zirconium or hafnium in preparation for catalyst impregnation.

23. A method as claimed in any of claims 19 to 22 wherein the silanol group concentration is decreased prior to treatment with the modifier metal compounds by calcination treatment, chemical dehydration or other suitable methods.

24. A method according to any of claims 19 to 24, wherein the modifier metal cation source is a solution of the said compounds so that the compounds are in solution when contacted with the support to effect adsorption onto the support.

25. A method according to claim 24, wherein the solvent for the said solution is other than water.

26. A method according to claim 23 or 24, wherein the solvent is an aliphatic alcohol, typically selected from C1-C6 alkanols such as methanol, ethanol, propanol, iso-propanol, butanols, pentanols and hexanols, more typically, methanol, ethanol or propanols.

27. A method as claimed in any of claims 19 to 26 wherein one or more non-labile ligands are attached to the modifier metal cations to at least partially form the said compounds and are selected from molecules with lone pair containing oxygen or nitrogen atoms able to form 5 or 6 membered rings with a zirconium or hafnium atom, including diones, diimines, diamines, diols, dicarboxylic acids or derivatives thereof such as esters,