CLAIMS:

1. A method for producing a metal nitride and metal carbide, the method comprising:

   i) contacting at least one metal oxide comprising at least one first metal M^1 with a cyanometallate comprising at least one second metal M^2 to form a reaction mixture, wherein the cyanometallate comprises a dicyanometallate, a tetracyanometallate, a hexacyanometallate, and/or an octacyanometallate; and,

   ii) subjecting the reaction mixture to a temperature of at least 300ºC for a reaction period.

2. The method according to claim 1, wherein the reaction is conducted under a nitrogen atmosphere.

3. The method according to claim 1 or 2, wherein M^1 is a transition metal selected from Groups 5, 6 or 7 of the Periodic Table of the Elements; preferably wherein M^1 is selected from the list consisting of: W, Re, Nb and Mo; in particular from W and Re; more preferably wherein the metal oxide comprises WO_3 and/or wherein the metal oxide comprises Re_2O_7.

4. The method according to any one of claims 1 to 3, wherein the cyanometallate is a tetracyanometallate and/or a hexacyanometallate; preferably wherein the cyanometallate comprises a material having the formula $M^3_x[M^2(CN)_y]_z$, wherein M^2 and M^3 are the same or different metals, wherein x is an integer from 1 to 4, y is 4 or 6, and z is an integer from 1 to 3; more preferably wherein x is 1, z is 1 and y is 6 or x is 4, z is 3, and y is 6.

5. The method according to any one of claims 1 to 4, wherein M^2 is a transition metal selected from Groups 8 and 9 of the Periodic Table of the Elements; preferably wherein M^2 is selected from the list consisting of Fe(II), Fe(III) and Co(III).

6. The method according to any one of claims 1 to 5, wherein M^3 is selected from the list consisting of K(I), Fe(III), Co(III), Y(III), Al(III), Ga(III), La(III), Pr(III) and Dy(III); preferably wherein M^3 is selected from the list consisting of Fe(III) and Co(III).

7. The method according to any one of claims 1 to 6, wherein the cyanometallate comprises $Fe_4[Fe(CN)_6]_3$, $K_3[Fe(CN)_6]$, $Y[Fe(CN)_6]$, $Al[Fe(CN)_6]$, $La[Fe(CN)_6]$, $Pr[Fe(CN)_6]$, $Dy[Fe(CN)_6]$, $Co[Co(CN)_6]$, $Y[Co(CN)_6]$, $Al[Co(CN)_6]$, $La[Co(CN)_6]$ and/or $K_3[Co(CN)_6]$; preferably wherein the cyanometallate comprises $Fe_4[Fe(CN)_6]_3$ and/or $Co[Co(CN)_6]$.

8. The method according to any one of claims 1 to 7, wherein the molar ratio of metal oxide to cyanometallate in contacting step i) is from 10:1 to 1:10.

9. The method according to any one of claims 1 to 8, wherein the cyanometallate and the metal oxide are combined in the presence of a solvent and wherein the cyanometallate is provided in the form of a cyanogel that comprises a mixture of: a) the cyanometallate, and b) at least part of the solvent.

10. The method according to any one of claims 1 to 8, wherein the cyanometallate and the metal oxide are provided in solid form, and wherein contacting step i) comprises combining the metal oxide with the cyanometallate using a dry mixing method.

11. The method according to any one of claims 1 to 10, wherein the reaction mixture is subjected to a temperature of from 300 to 1000ºC for a reaction period of from 10 minutes to 48 hours.

12. A metal nitride and metal carbide comprising:

a) a first metal nitride and/or carbide selected from the list consisting of: iron nitride, iron carbide, cobalt nitride and cobalt carbide; and
b) a second metal nitride and/or carbide selected from the list consisting of: tungsten nitride, tungsten carbide, rhenium nitride and rhenium carbide.

13. A metal nitride and metal carbide according to claim 12 prepared by the method of claim 1.

14. A metal nitride and metal carbide according to any one of claims 12 to 13 comprising tungsten nitride, iron nitride and iron carbide.

15. A method of use of the metal nitride and carbide of any one of claims 12 to 14, wherein the metal nitride and carbide is used as a hydroprocessing, hydrogenation, hydrodenitrogenation and/or hydrodesulfurization catalyst.