Claims.

1. A process for removing heavy metals from process fluids comprising passing a heavy-metal-containing process fluid, comprising a reductant selected from hydrogen and carbon monoxide, at an inlet temperature ≤ 125°C over a sorbent comprising
   (i) 4-75% by weight of one or more sulphided copper compounds selected from sulphided basic copper carbonate, sulphided copper hydroxide, sulphided copper oxide or mixtures of these,
   (ii) optionally a support material, and
   (iii) a binder and the binder content of the sorbent is in the range 5-30% by weight,
   wherein essentially all of the sulphided copper is in the form of CuS and the total metal sulphide content of the sorbent, other than copper sulphide, is ≤ 5% wt.

2. A process according to claim 1 wherein the sorbent comprises a support material selected from the group consisting of alumina, hydrated alumina, titania, zirconia, silica or aluminosilicate, or a mixture of two or more of these.

3. A process according to claim 1 or claim 2 wherein the sorbent comprises a first binder and a second binder, wherein the first binder is a cement binder and the second binder is a high aspect ratio binder having an aspect ratio >2.

4. A process according to claim 3wherein the first binder is a calcium aluminate cement binder.

5. A process according to claim 3 or claim 4 wherein the second binder is an aluminosilicate clay.

6. A process according to any one of claims 3 to 5 wherein the relative amounts of the first and second binder are in the range 1:1 to 3:1 (first to second binder).

7. A process according to any one of claims 1 to 6 wherein the total metal sulphide content of the sorbent, other than copper sulphide, is ≤ 0.1% wt, preferably ≤ 0.5% wt.

8. A process according to any one of claims 1 to 7 wherein the density of the sorbent, expressed as the sulphur density, is in the range 50 to 200 kg S/m^3.

9. A process according to any one of claims 1 to 8 wherein the process fluid is a liquid hydrocarbon stream containing dissolved hydrogen and/or carbon monoxide.

10. A process according to any one of claims 1 to 8 wherein the process fluid is a gaseous stream containing hydrogen and/or carbon monoxide.

11. A process according to claim 10 wherein the gaseous stream comprises a reductant in the range 1-100% by volume, preferably 5-95%, more preferably either 1-49% vol or 50-95% vol.

12. A process according to claim 10 wherein the process fluid is a synthesis gas stream.

13. A process according to claim 10 wherein the process fluid is selected from a refinery vent stream, a refinery cracker stream, a blast furnace gas, a reducing gas, and a hydrogen-rich gas stream,

14. A process according to any one of claims 1 to 13 wherein the process fluid inlet temperature is ≤ 100°C, preferably ≤ 95°C.

15. A process according to any one of claims 1 to 14 wherein the process fluid further comprises water in the range 0.02 to 1% vol.

Claims.

1. A process for removing heavy metals from process fluids comprising passing a heavy-metal-containing process fluid, comprising a reductant selected from hydrogen and carbon monoxide, at an inlet temperature ≤ 125°C over a sorbent in the form of extrudates or granules comprising
   (i) 4-75% by weight of one or more sulphided powdered copper compounds selected from sulphided basic copper carbonate, sulphided copper hydroxide, sulphided copper oxide or mixtures of these,
   (ii) optionally a powdered support material, and
   (iii) a binder and the binder content of the sorbent is in the range 5-30% by weight,
   wherein essentially all of the sulphided copper is in the form of CuS and the total metal sulphide content of the sorbent, other than copper sulphide, is ≤ 5% wt.

2. A process according to claim 1 wherein the sorbent comprises a support material selected from the group consisting of alumina, hydrated alumina, titania, zirconia, silica or aluminosilicate, or a mixture of two or more of these.

3. A process according to claim 1 or claim 2 wherein the sorbent comprises a first binder and a second binder, wherein the first binder is a cement binder and the second binder is a high aspect ratio binder having an aspect ratio >2.

4. A process according to claim 3wherein the first binder is a calcium aluminate cement binder.

5. A process according to claim 3 or claim 4 wherein the second binder is an aluminosilicate clay.

6. A process according to any one of claims 3 to 5 wherein the relative amounts of the first and second binder are in the range 1:1 to 3:1 (first to second binder).

7. A process according to any one of claims 1 to 6 wherein the total metal sulphide content of the sorbent, other than copper sulphide, is ≤ 0.1% wt, preferably ≤ 0.5% wt.

8. A process according to any one of claims 1 to 7 wherein the density of the sorbent, expressed as the sulphur density, is in the range 50 to 200 kg S/m^3.

9. A process according to any one of claims 1 to 8 wherein the process fluid is a liquid hydrocarbon stream containing dissolved hydrogen and/or carbon monoxide.

10. A process according to any one of claims 1 to 8 wherein the process fluid is a gaseous stream containing hydrogen and/or carbon monoxide.

11. A process according to claim 10 wherein the gaseous stream comprises a reductant in the range 1-100% by volume, preferably 5-95%, more preferably either 1-49% vol or 50-95% vol.

12. A process according to claim 10 wherein the process fluid is a synthesis gas stream.

13. A process according to claim 10 wherein the process fluid is selected from a refinery vent stream, a refinery cracker stream, a blast furnace gas, a reducing gas, and a hydrogen-rich gas stream,

14. A process according to any one of claims 1 to 13 wherein the process fluid inlet temperature is $\leq 95^{\circ}C$.

15. A process according to any one of claims 1 to 14 wherein the process fluid further comprises water in the range 0.02 to 1% vol.