adding the isolated MOF to a washing solution;

contacting the MOF containing washing solution with an acoustic reflector surface such that, any high frequency ultrasound applied within the washing solution reflects off the acoustic reflector surface such that a standing wave is formed through constructive interference; and

applying a high frequency ultrasound of at least 20 kHz to a MOF containing solution, thereby separating any contaminant from the MOF within the solution.

15. A method according to any preceding claim, wherein the MOF comprises a plurality of metal clusters, each metal cluster including one or more metal ions; and a plurality of charged multidentate linking ligands connecting adjacent metal clusters.

16. A method according to claim 15, wherein each metal cluster comprises two or more metal ions and each ligand of the plurality of multidentate ligand includes two or more carboxylates.

17. A method according to claim 16, wherein the metal ion is selected from the group consisting of Group 1 through 16 metals of the IUPAC Periodic Table of the Elements including actinides, and lanthanides, and combinations thereof.

18. A method according to claim 15, 16 or 17, wherein the multidentate linking ligand has 6 or more atoms that are incorporated in aromatic rings or non-aromatic rings, preferably 12 or more atoms that are incorporated in aromatic rings or non-aromatic rings.

19. A metal organic framework separation apparatus configured to separate a metal organic framework (MOF) from a solution, comprising:

a housing having a reservoir capable of receiving a MOF containing solution;

a high frequency ultrasound transducer operatively connected to the reservoir and capable of applying megasonic frequencies of at least 20 kHz to the MOF containing solution; and

an acoustic reflector surface spaced apart from the transducer within the housing, the transducer, in use, being operated to reflect said applied high frequency ultrasound off the acoustic reflector surface, said acoustic reflector surface being spaced away from the high frequency ultrasound transducer such that a standing wave is formed through constructive interference.

20. A metal organic framework separation apparatus according to claim 19, wherein the applied high frequency ultrasound is between 20 kHz to 4 MHz, preferably 500 kHz to 2 MHz, more preferably between 800 kHz and 2 MHz, and yet more preferably between 1 MHz and 2 MHz.

21. A metal organic framework separation apparatus according to claim 19 or 20, wherein the housing comprises a container including at least one wall position to contact the MOF containing solution, and the transducer is high frequency ultrasound transducer is position within the reservoir or in engagement with the at least one wall.

22. A metal organic framework separation apparatus according to any one of claims 19 to 21, wherein the acoustic reflector surface is generally located in front of the transducer, and spaced apart from that transducer.

23. A metal organic framework separation apparatus according to any one of claims 20 to 22, wherein the high frequency ultrasound transducer comprises a plate transducer.

24. A metal organic framework separation apparatus according to any one of claims 19 to 23, wherein the housing includes at least one reflector surface designed to reflect the applied megasonic frequencies within the reservoir.

25. A method according to any one of claims 1 to 18 using an apparatus according to any one of claims 19 to 24.

26. A process of producing a metal organic framework (MOF), comprising:

forming a MOF in a reactor; and

isolating, washing and/or purifying the MOF using an apparatus according to any one of claims 19 to 24.

27. A system for producing a metal organic framework (MOF), comprising:

a reactor for forming a metal organic framework from precursor materials; and

an apparatus for washing and/or purifying the MOF according to any one of claims 19 to 24.

28. A process or system according to claim 26 or 27, wherein the reactor is a continuous flow reactor.

29. A method of separating a metal organic framework (MOF) from at least one contaminant, comprising:

providing a MOF containing solution which includes a MOF and at least one contaminant;

contacting the MOF containing solution with an acoustic reflector surface such that, any high frequency ultrasound applied within the MOF containing solution reflects off the acoustic reflector surface such that a standing wave is formed through constructive interference; and

applying a high frequency ultrasound of at least 20 kHz to the MOF containing solution,

thereby substantially separating the MOF from the contaminant.

30. A method of activation of a metal organic framework (MOF), comprising:

providing a MOF containing solution;

contacting the MOF containing solution with an acoustic reflector surface such that, any high frequency ultrasound applied within the MOF containing