Metal–organic frameworks (MOFs) are a class of compounds consisting of metal ions or clusters coordinated to organic ligands to form one-, two-, or three-dimensional structures. They are a subclass of coordination polymers, with the special feature that they are often porous. The organic ligands included are sometimes referred to as "struts", one example being 1,4-benzenedicarboxylic acid (BDC).

More formally, a metal–organic framework is a coordination network with organic ligands containing potential voids. A coordination network is a coordination compound extending, through repeating coordination entities, in one dimension, but with cross-links between two or more individual chains, loops, or spiro-links, or a coordination compound extending through repeating coordination entities in two or three dimensions; and finally a coordination polymer is a coordination compound with repeating coordination entities extending in one, two, or three dimensions.

In some cases, the pores are stable during elimination of the guest molecules (often solvents) and could be refilled with other compounds. Because of this property, MOFs are of interest for the storage of gases such as hydrogen and carbon dioxide. Other possible applications of MOFs are in gas purification, in gas separation, in catalysis, as conducting solids and as supercapacitors.

The synthesis and properties of MOFs constitute the primary focus of the discipline called reticular chemistry (from Latin reticulum, "small net").In contrast to MOFs, covalent organic framework (COFs) are made entirely from light elements (H, B, C, N, and O) with extended structures.