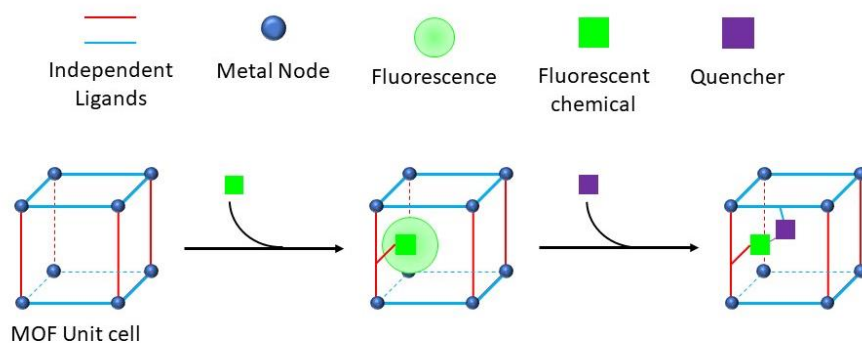


## Abstract

This project sought the synthesis of a functional sensing metal-organic framework (MOF) material through ligand modification (LM) and post-synthetic modification (PSM). MOFs are porous, crystalline materials made of metal ion nodes, and chemical ligands connecting these nodes, in a uniform structure. These materials are highly customizable, and as such can be tuned to serve a variety of functions, such as sensing. Sensing is a detection mechanism that indicates an interaction with a desired substance through fluorescence, a clearly visible change in color or color intensity, of the sensing material. LM is a method that customizes a ligand before it is incorporated into the structure, and PSM is a method of customizing a ligand after the structure has been synthesized.

LM was attempted on a fluorescent ligand which was used in making the fundamental structure of the desired MOF, but modifying the ligand to increase its sensing capabilities was not successful. It was further attempted to synthesize a sensing MOF via PSM, using a fluorescent chemical and a removable quencher, a chemical that stops the fluorescence by binding to the fluorescent group. The attempt at attaching the fluorescent chemical to a MOF similar to the desired MOF was unsuccessful, and the modification of the desired MOF was not pursued further.



**Figure 1:** Modification of a MOF via PSM, adding the fluorescent chemical first, then a removable quencher to stop the fluorescence.