Bachelor Thesis

Use of a ligand containing a pyrazole functionality and two carboxyl groups to construct new MOFs for applications in gas storage

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Summary

CHAPTER 1: INTRODUCTION

Over the past 150 year supramolecular chemistry has grown exponentially: the field has expanded to include a wide range of applications, in what can be the defined as a new chemical space.
This chapter aims to provide a brief historical account of the most significant development in supramolecular chemistry, specifically speaking about MOFs and 3D periodic structures and their implementation in gas adsorption and electrochemistry applcations.

CHAPTER 2: RESULT AND DISCUSSION

The construction of 3D periodic solid structure oriented towards specific gas adsorbpion remain a challenging syntethic problem for chemists, several problem related to their development and use must be accounted.
In this chapter will be reported the advancement in the sythesis of a pyrazole based ligand and the utilization of a 1,3 diketons ligand in electrochemistry oriented application.

CHAPTER 3: EXPERIMENTAL SECTION

Several syntethis and characterization method as been applied, both in the sythesis of pyrazole based ligand and 1,3 diketones MOF electrochemistry exploration, in order to achieve the results discussed earlier.
They will be analyzed in great detail in this chapter.

CHAPTER 4: TOOL DEVELOPMENT

During the time spent working on these wide range topics the need of small and reliable analytical tools raised. Being able to analyze and draw a comparison beetween obtained results in a fast manner has been very important.
Across this chapter will be presented a tiny python implementation for fast data analysis and graphs creation.

Contents

1 Introduction

1.1 Supramolecolar Chemistry, why?

Supramolecular chemistry can be classified as the branch of chemistry concerned about the interplay between designed molecular assemblies and intermolecular bonds, or more colloquially referred to as "chemistry beyond the molecule".
The discipline focuses on the design and synthesis of molecular architectures by relying on the complementary recognition, and subsequent assembly, of well-defined subunits. The products of complementary synthesis, the so-called "supermolecules" are sustained by noncovalent interactions such as hydrogen bonding, halogen bonding, coordination forces and $\pi - \pi$.
The emergence of supramolecular chemistry has directly influenced how efficiently chemists can design and synthesize desired frameworks. The development and application of the bottom up approach is widely successful, owing to the noncovalent forces that dictate structural and morphological properties, while producing structures that were previously inaccessible.

2 Result and discussion

3 Experimental section

Bibliography