INVESTIGATING THE STRUCTURE-ACTIVITY RELATIONSHIP IN AN ISORETICULAR SERIES OF TTF BASED METAL-ORGANIC FRAMEWORKS

E. Kearns[1], D. Sherman,[1] Q. Gu[1], D. M. D'Alessandro[1]
[1]*School of Chemistry, University of Sydney, Sydney, NSW, Australia*
Email: ekea7127@uni.sydney.edu.au

Metal-Organic Frameworks (MOFs) which exhibit a distinctive and repeatable response to a change in conditions are deemed stimuli responsive or "smart" materials.[1] This work builds on the unique multifunctional behaviour recently discovered in a TTF based MOF which underwent a reversible single-crystal-to-single-crystal (SC-SC) double [2+2] photocyclisation (**Figure 1**).[2] Upon photocyclisation, quantifiable changes in the physical and chemical properties of the framework were observed.[2] In order to efficiently tune the response of this family of frameworks an understanding of the structure-activity relationships is essential. In this regard, a library of TTF based MOFs has been constructed wherein the systematic variation of the MOF constituents has enabled fundamental insights into the "smart" response of the material.

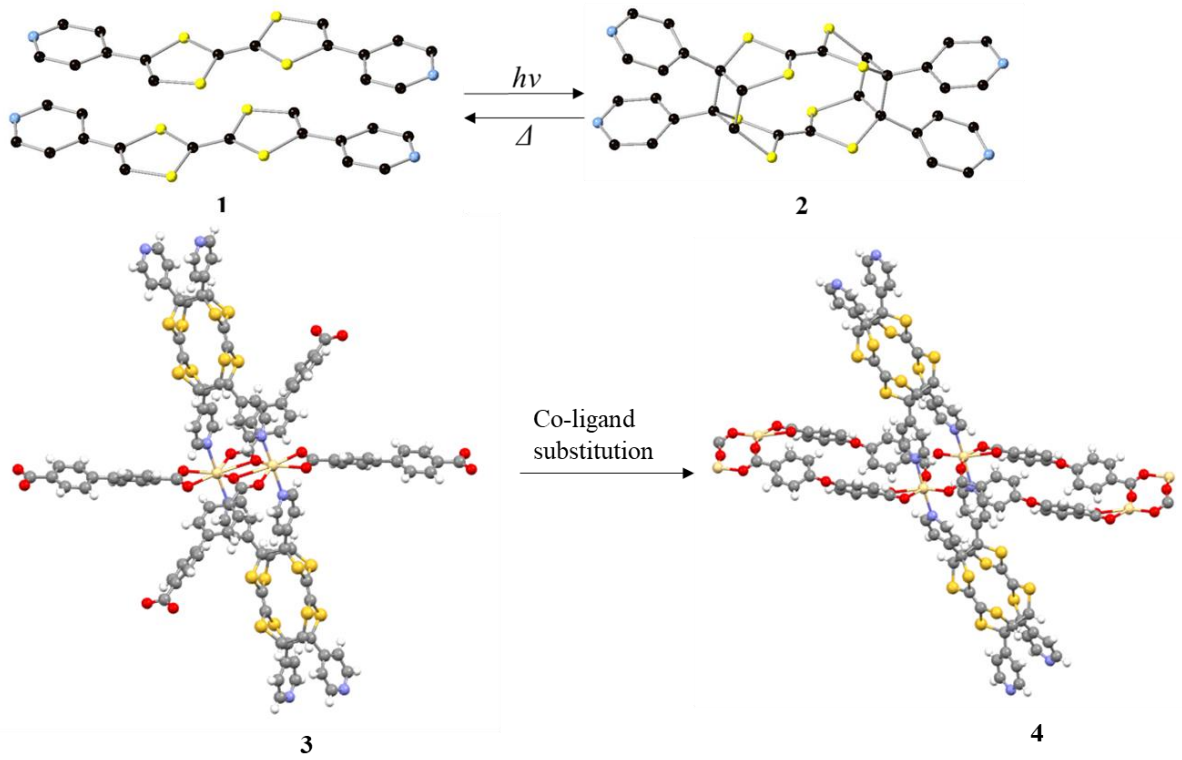

Figure 1: 1) Uncyclised TTF ligand in parent structure 2) Cyclised ligand in parent structure. 3) Secondary Building Unit (SBU) of parent structure. 4) SBU resulting from the variation of the coligand in parent structure.

(1) Nagarkar, S. S.; Desai, A. V.; Ghosh, S. K. Stimulus-Responsive Metal–Organic Frameworks. *Chem Asian J* **2014**, *9*, 2358–2376.
(2) Sherman, D. Enhancing Functionality of Redox-Active Metal-Organic Frameworks, University of Syndey, 2017.