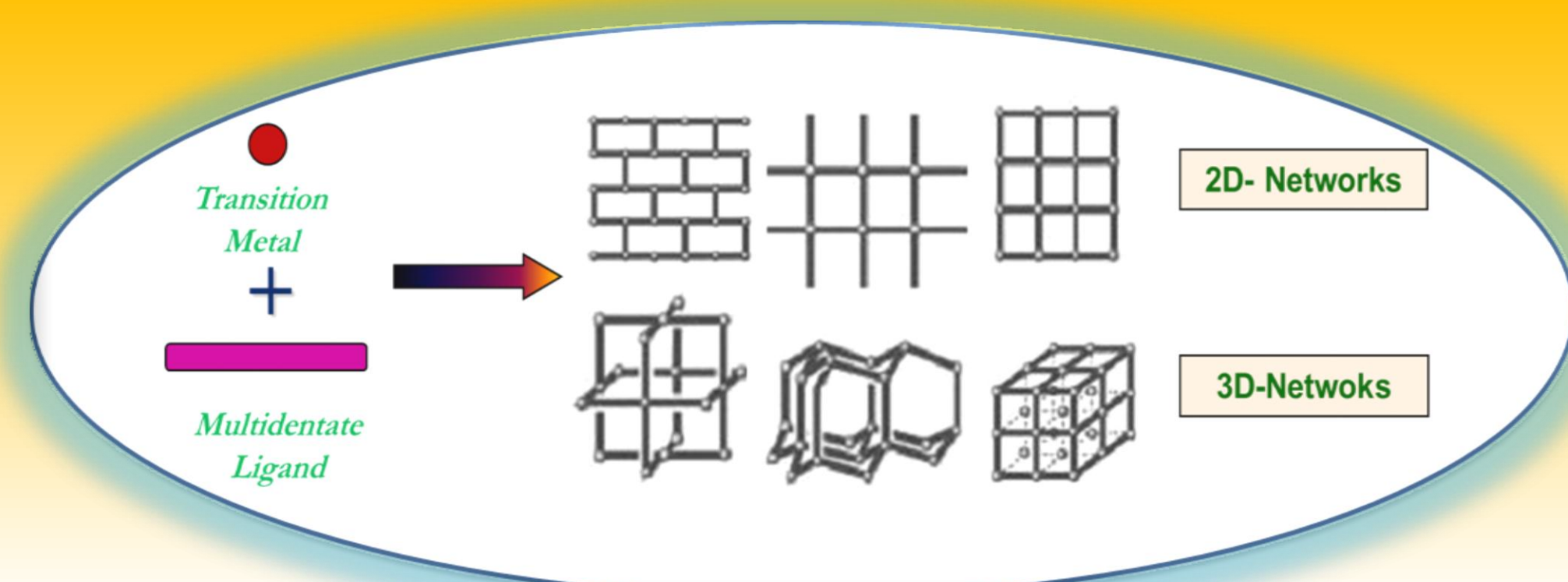
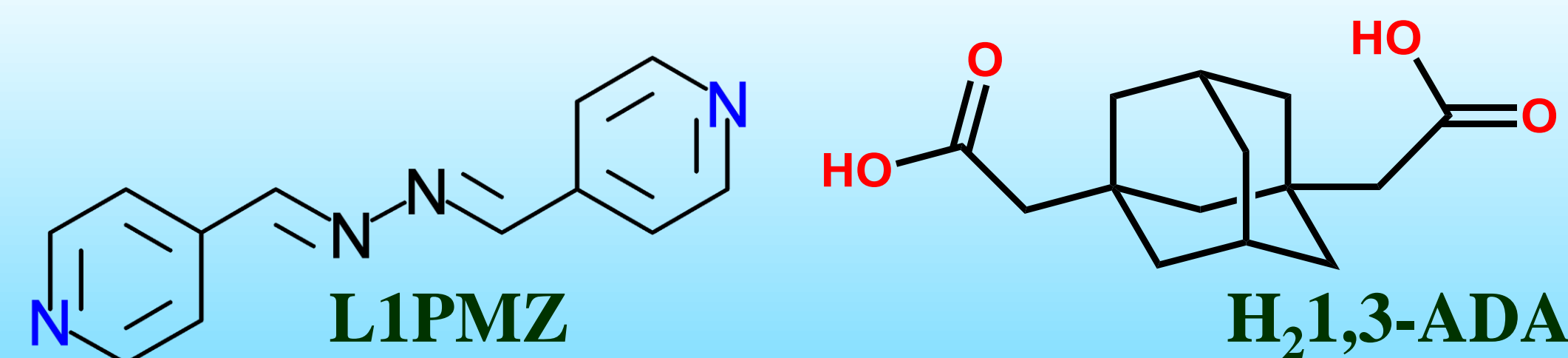


Coordination Polymers (CPs) or Metal-Organic Frameworks (MOFs) are extended polymeric solid materials which are being explored for last two decades for the applications in numerous fields including sensing and photocatalysis due to their modular (tunable) syntheses, porosity and large surface area.

As an extension of our endeavors to synthesize novel CPs, herein, we have chosen semirigid linear ligand **L1PMZ** (N,N-bis-pyridin-4-ylmethylene-hydrazine) along with flexible dicarboxylate **1,3-ADA** (1,3-adamantane diacetate) as the spacers and metal nodes Cu²⁺/Co²⁺ to synthesize new CPs [Cu(1,3-ADA)(L1PMZ)]_n (**1**), and [Co(1,3-ADA)(L1PMZ)]_n (**2**). Crystal structure of **1** and **2** revealed interesting 2D structures. These materials have shown functional capabilities towards iodine adsorption and photocatalytic degradation of methyleneblue (MB) dye.

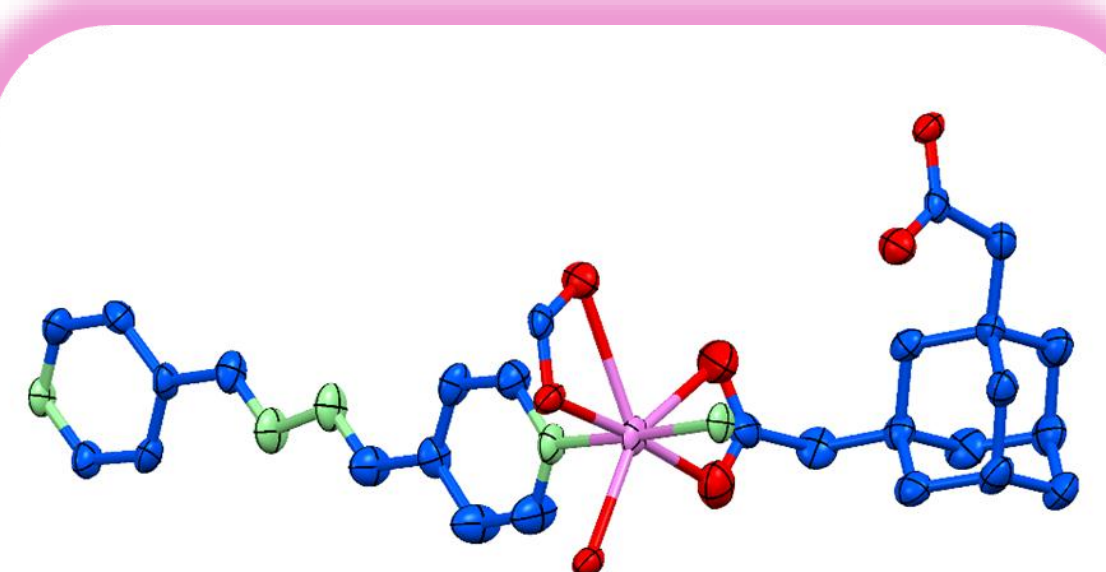


Schematic depiction of synthesis of CPs/MOFs

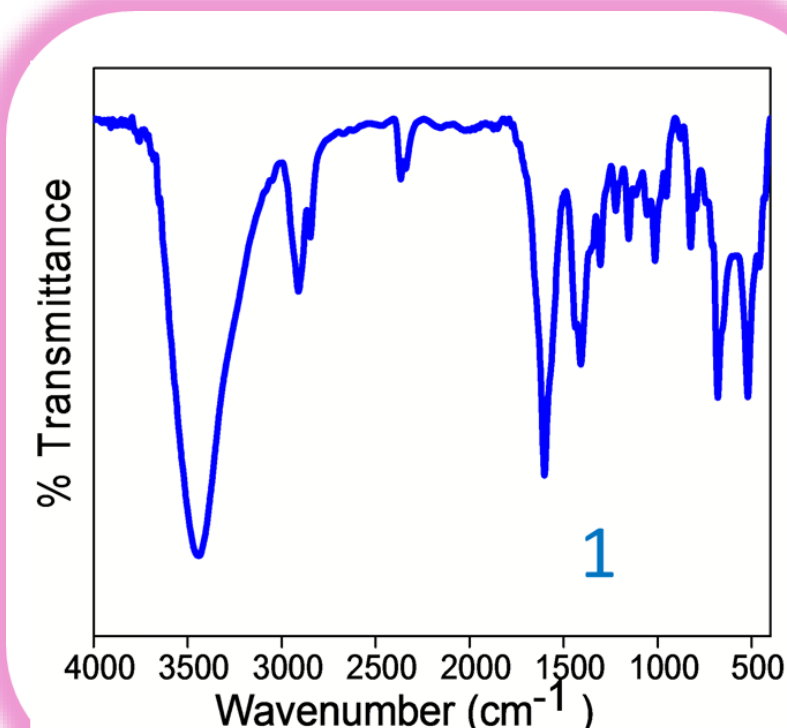


Ligands explored in present work

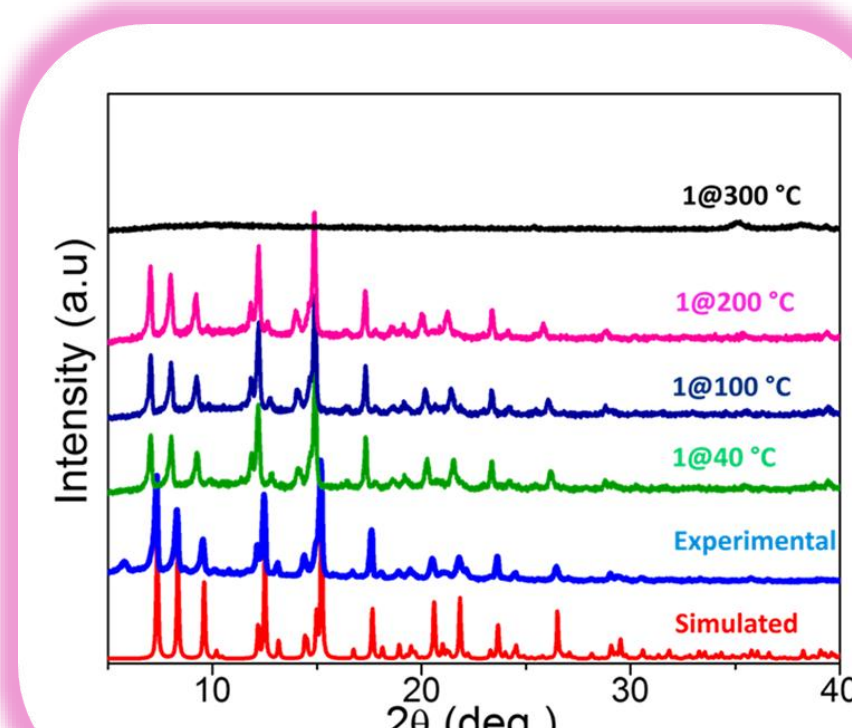
Characterization and Structural Aspects of [Cu(1,3-ADA)(L1PMZ)]_n (**1**)



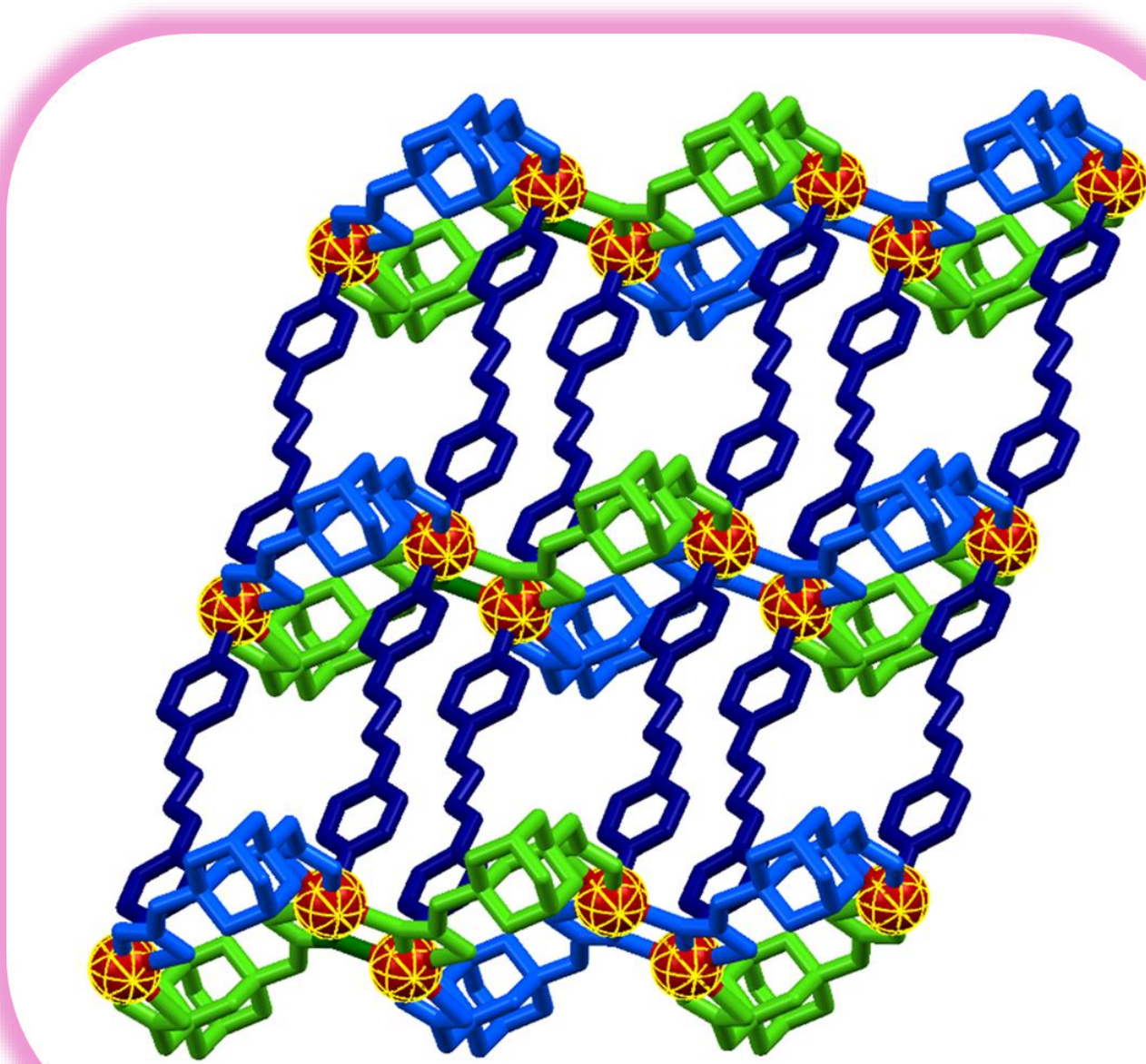
ORTEP diagram of **1**



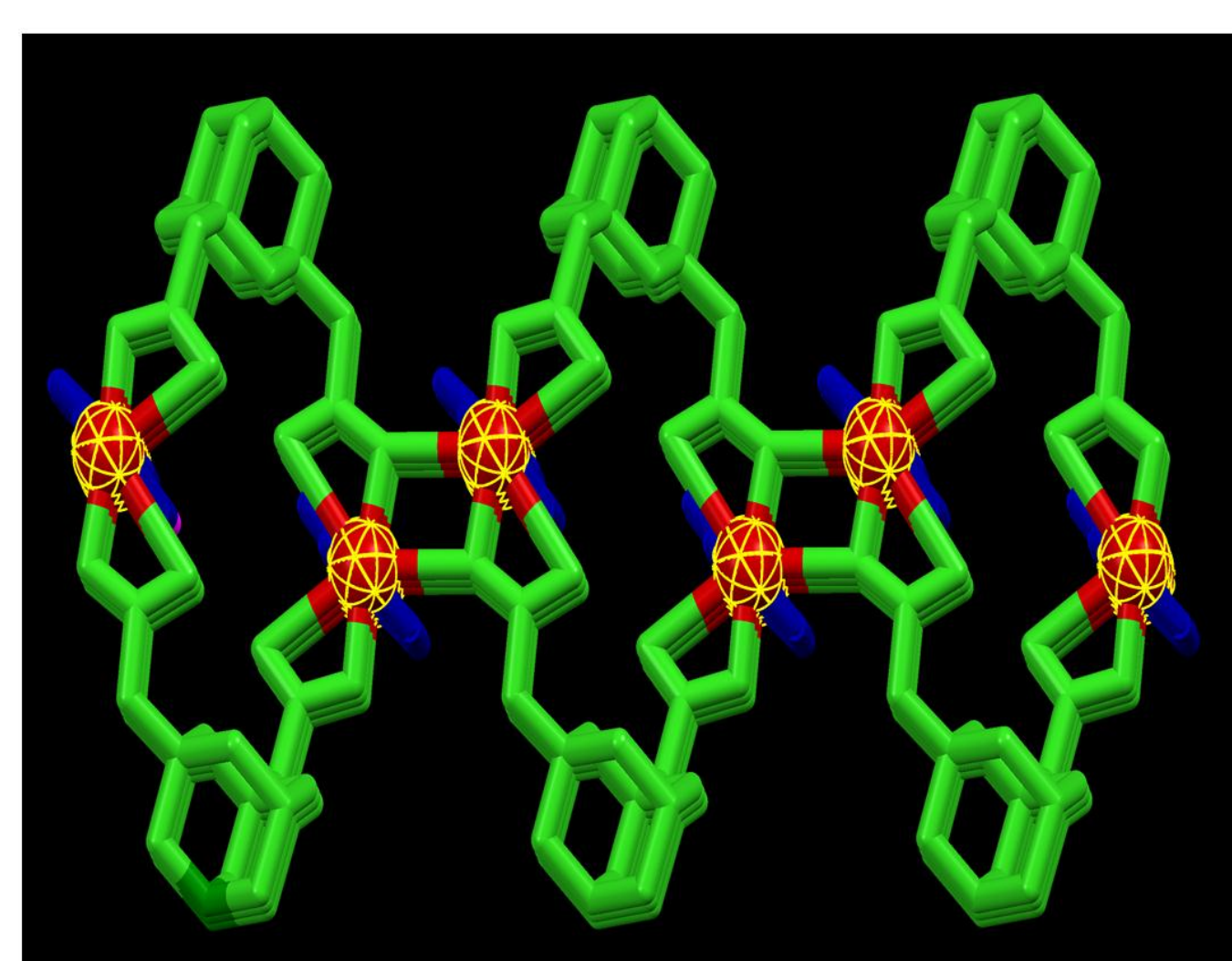
FTIR spectra of **1**



PXRD plots of **1** at various temp.

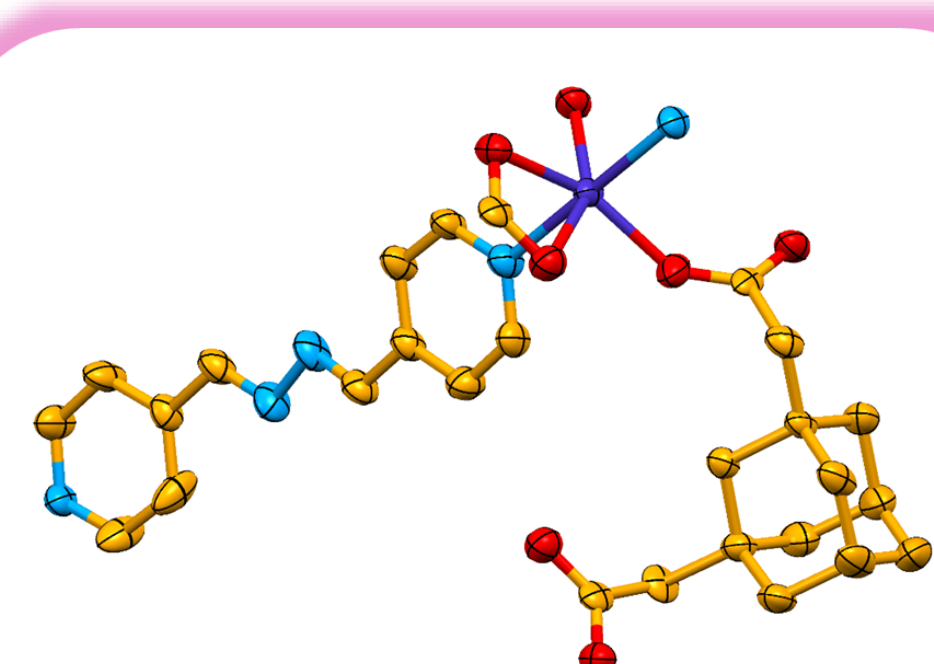


Pillar layer structure in **1** down b-axis

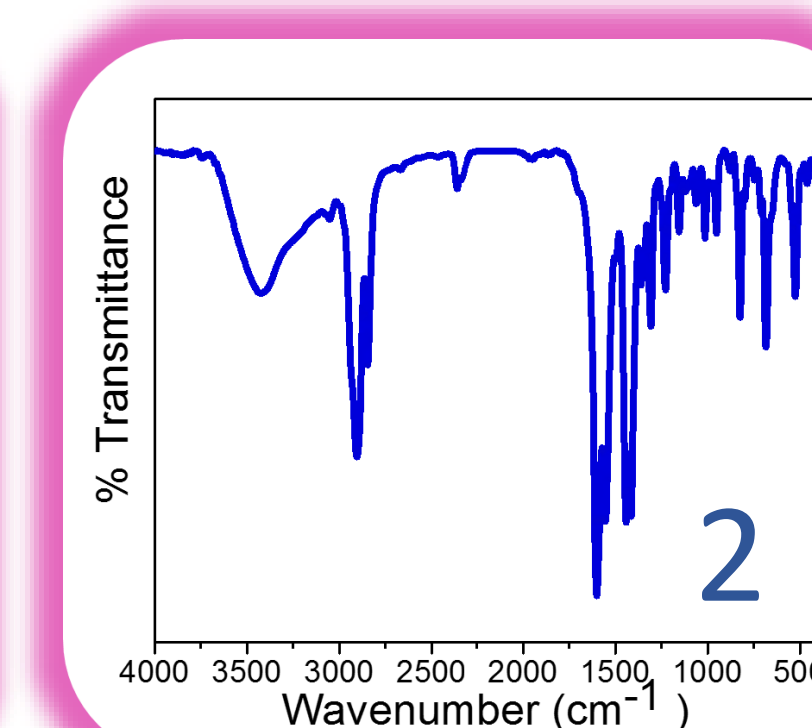


Cu(1,3-ADA)_n 1D chain in **1** along ab-plane

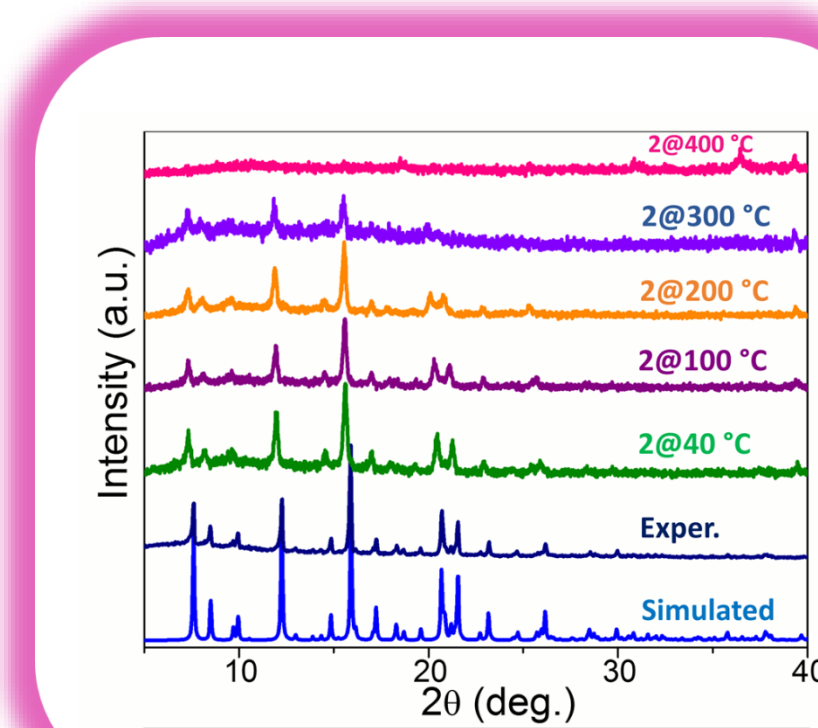
Characterization and Structural Aspects of [Co(1,3-ADA)(L1PMZ)]_n (**2**)



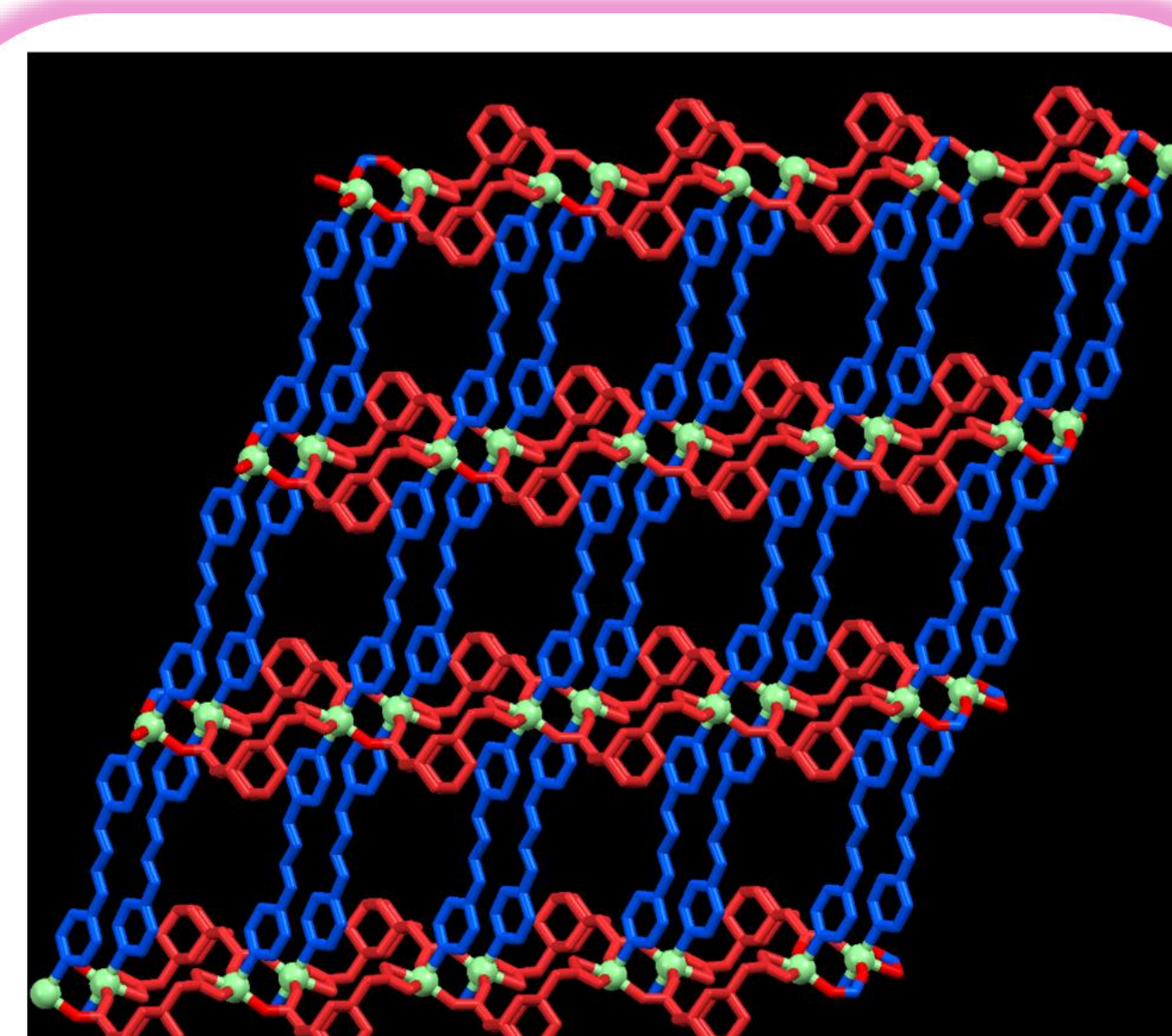
ORTEP diagram of **2**



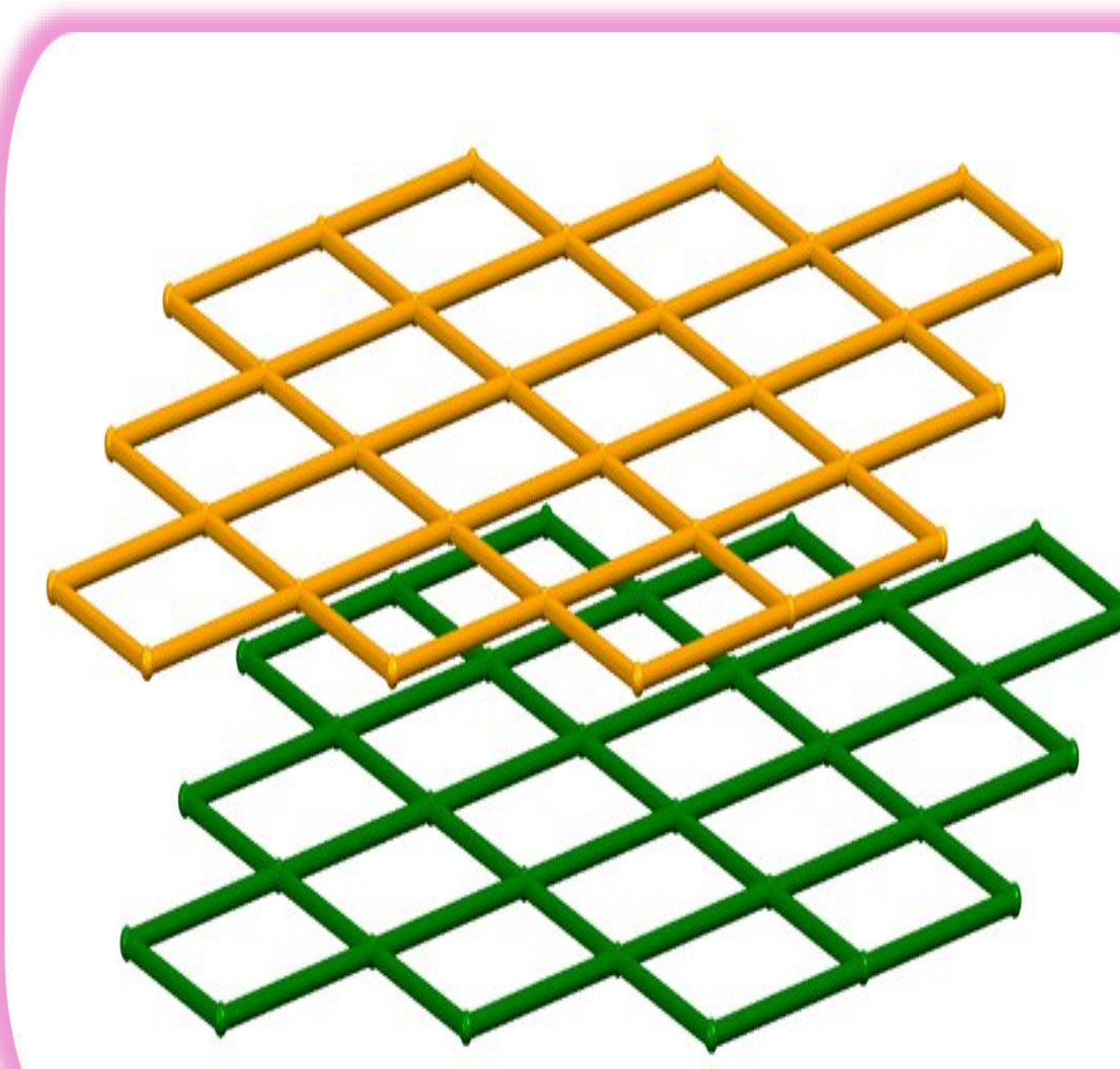
FTIR spectra of **2**



PXRD plots of **2** at various temp.

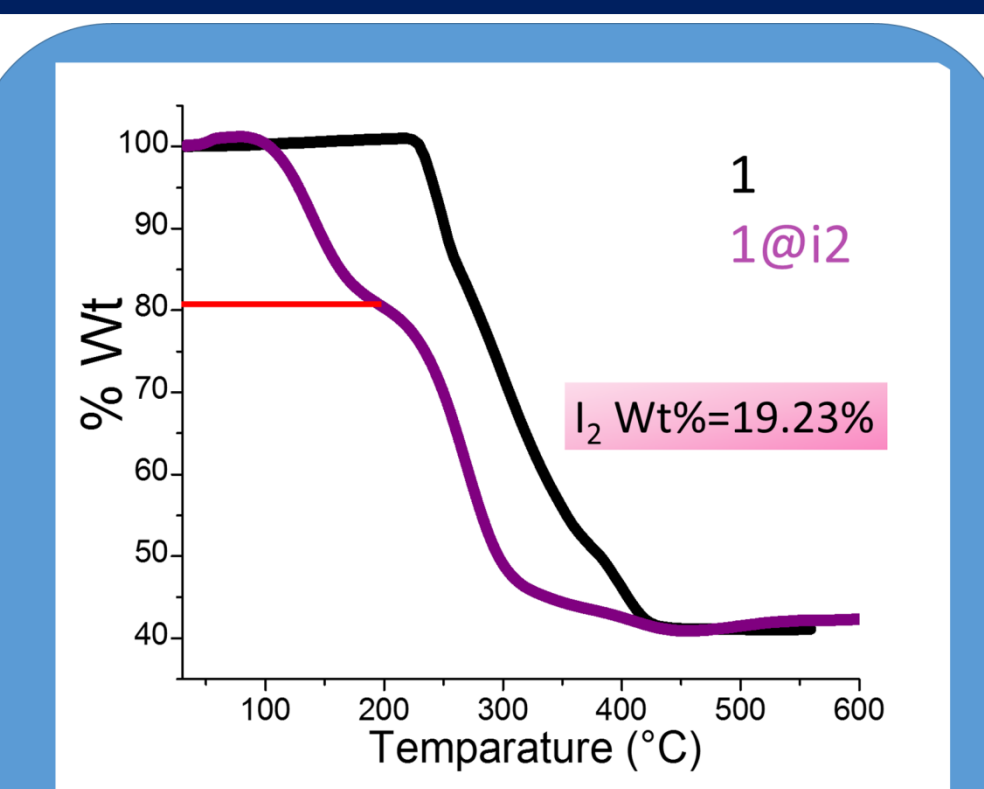


Pillar layer structure in **2** along c-axis

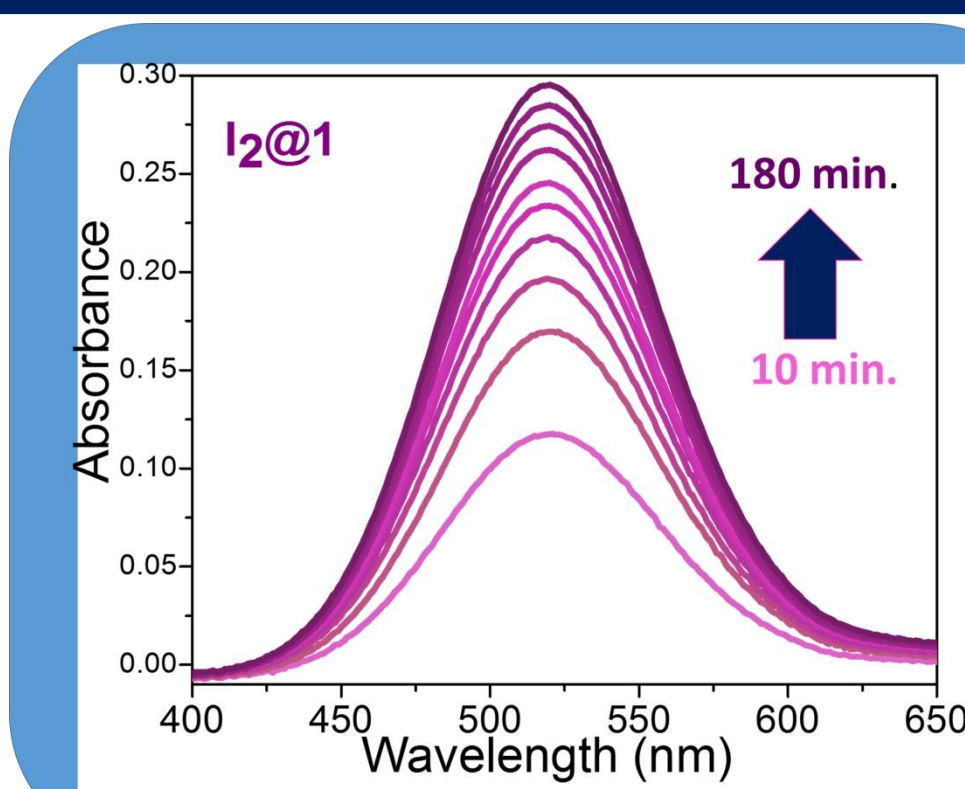


Simplified Topological 2D sheets in **2**

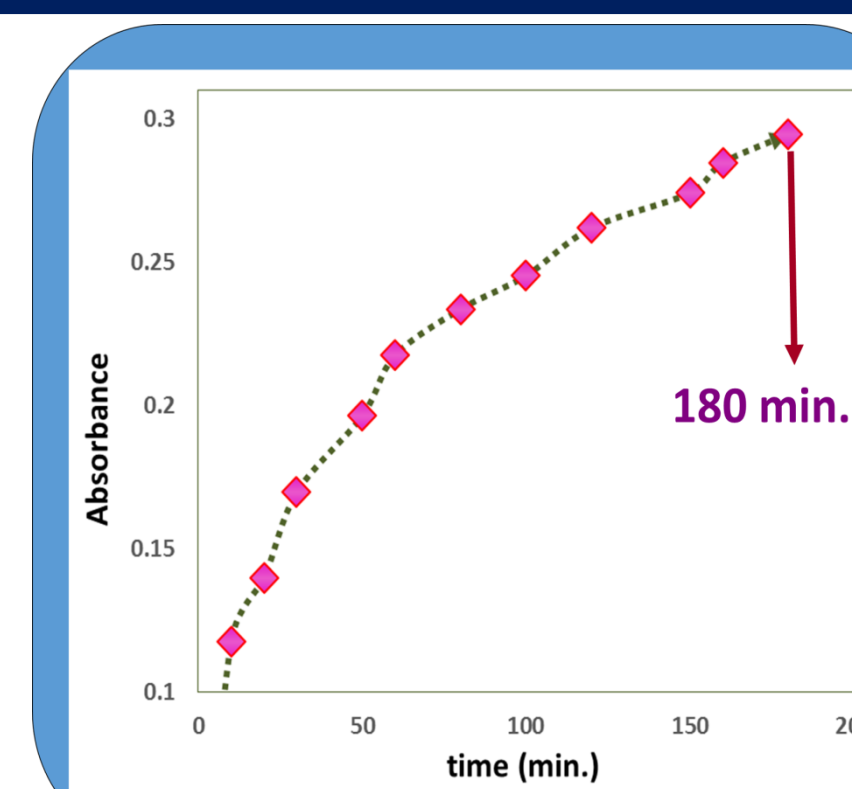
Reversible Iodine Uptake in **1**



TGA plots of **2**



Absorbance spectra for releasing I₂

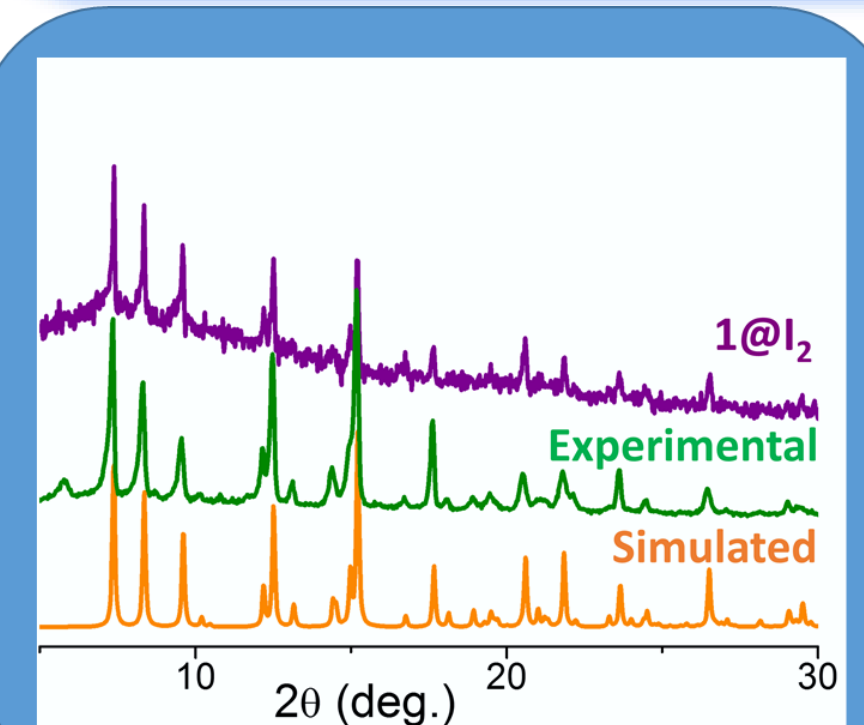


Increasing absorbance with time



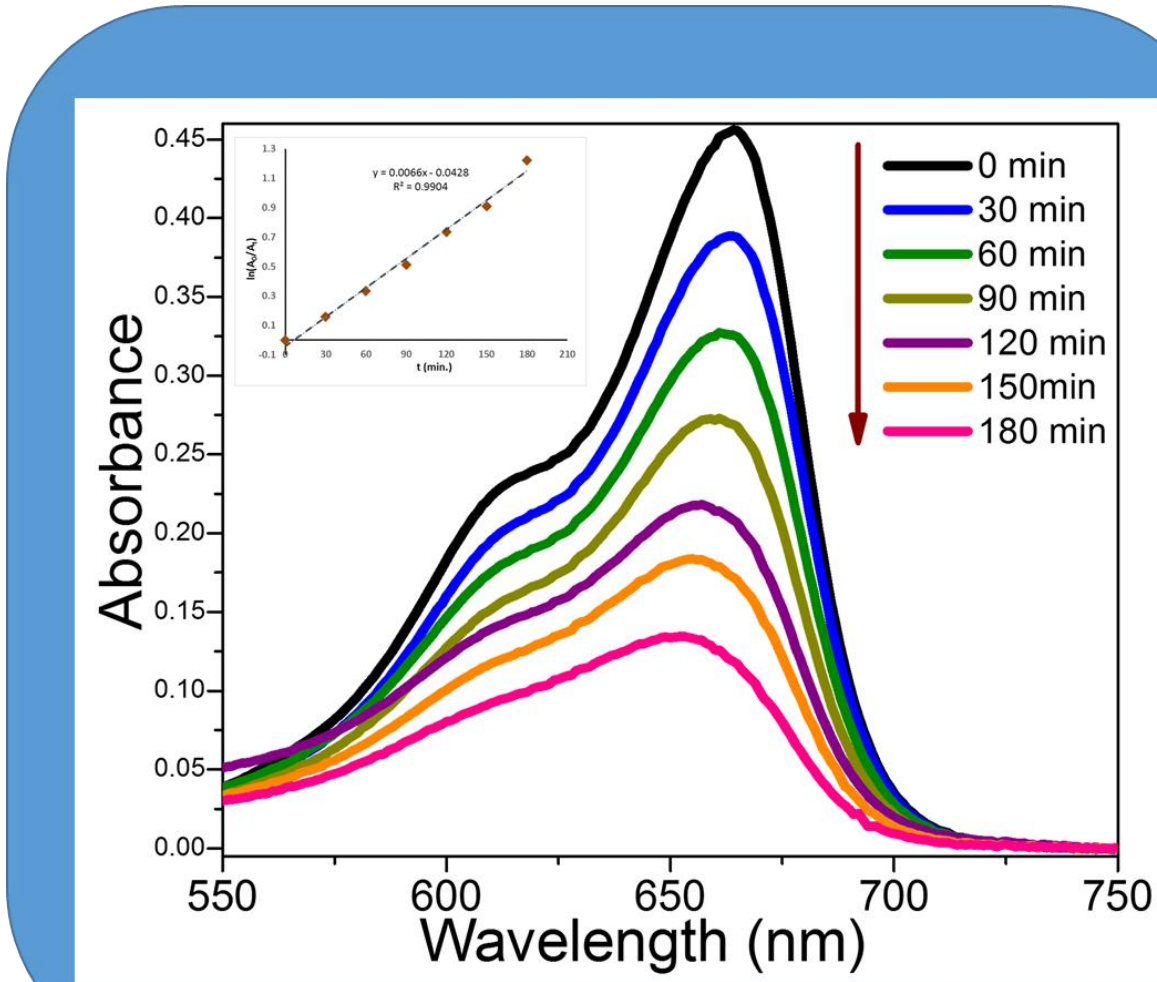
Digital Photographs of Iodine encapsulated Samples

Iodine adsorption study was carried out for **1**. 40 mg of **1** was taken in small vial and placed in closed containers and exposed to the iodine vapor at 80°C for 6 h. Releasing property was studied in hexane with time dependent UV-Vis spectra recorded at an interval of 10 min for 3 h presents the absorbance (λ_{max} 524 nm) enhancement due to increasing iodine concentration.

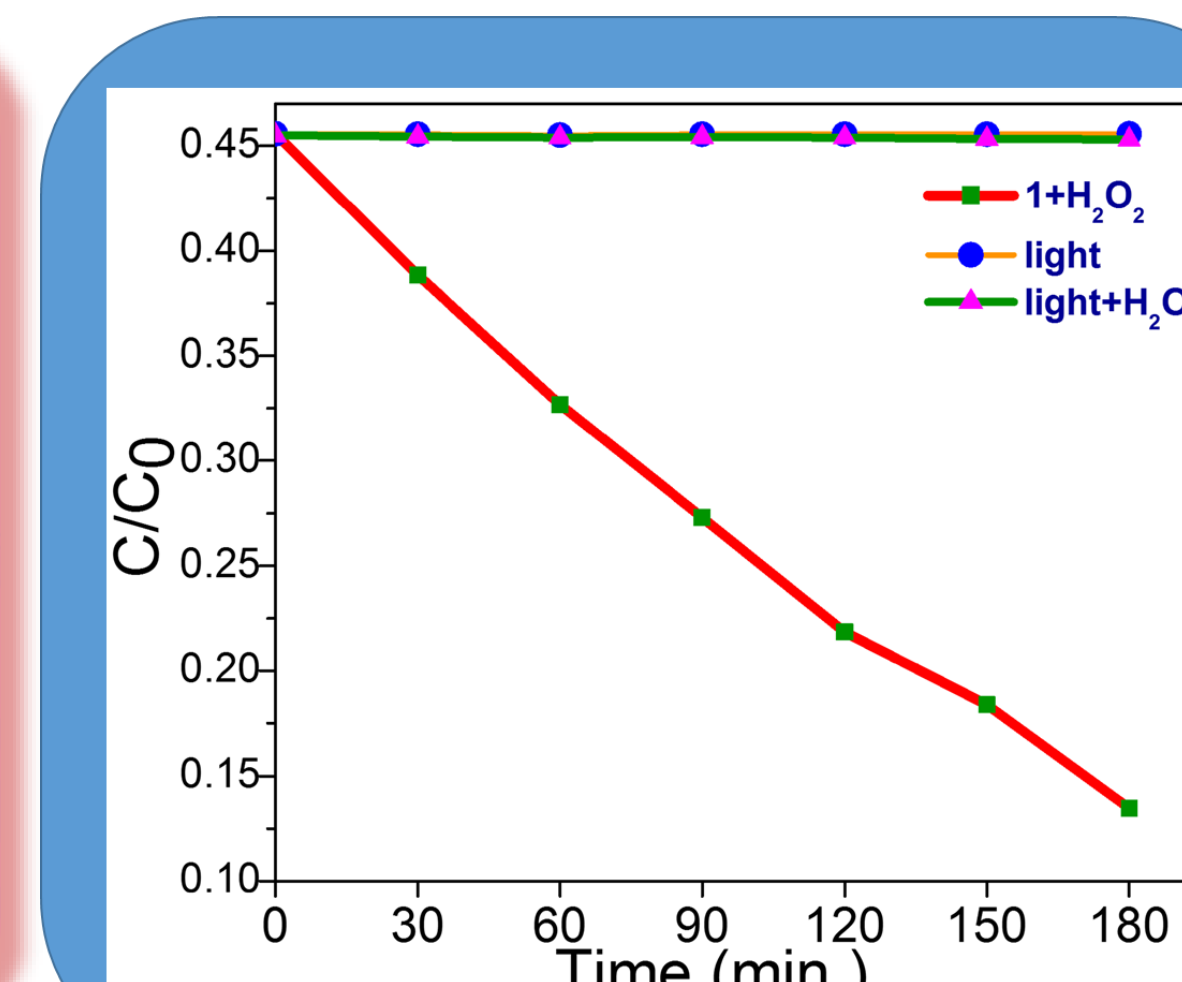
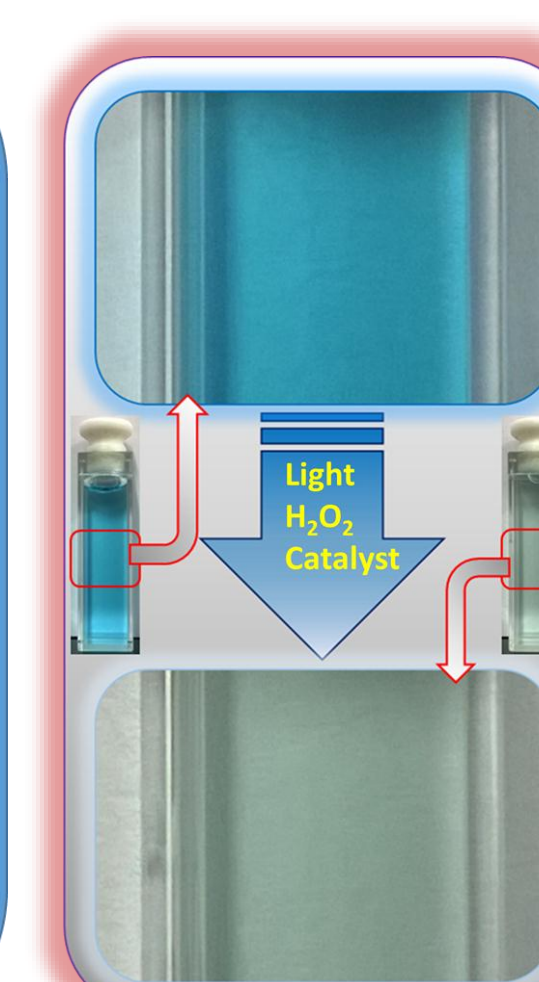


Comparison PXRD patterns of **1**

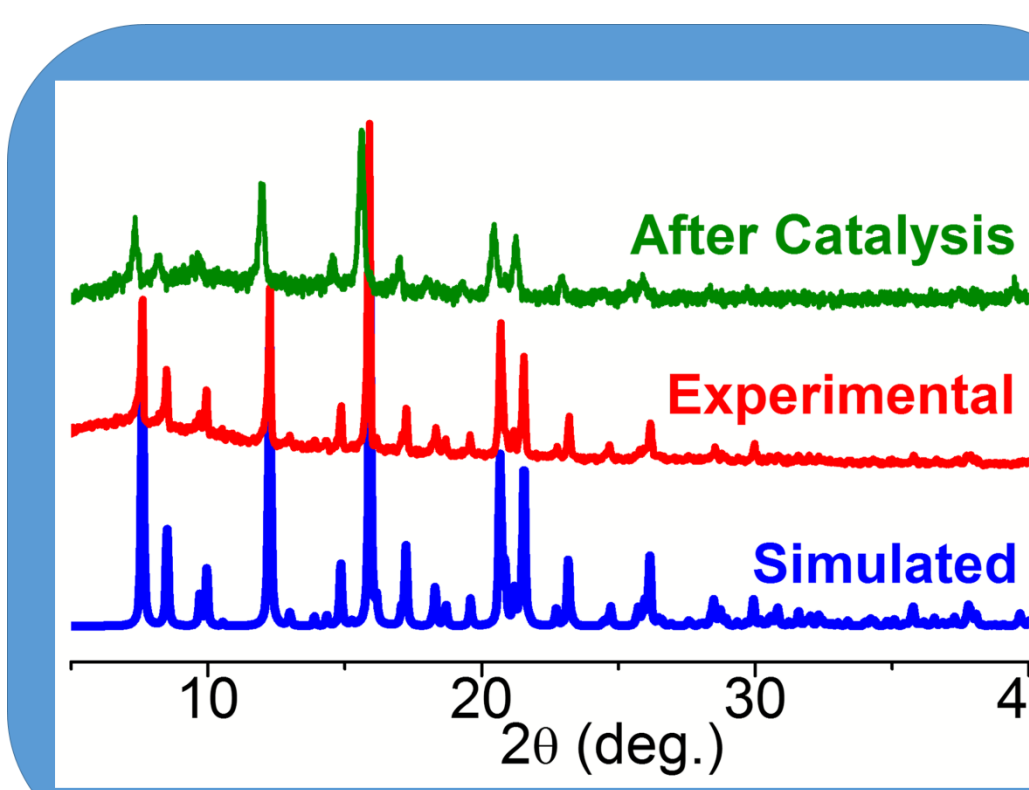
Photo Catalysis with **2**



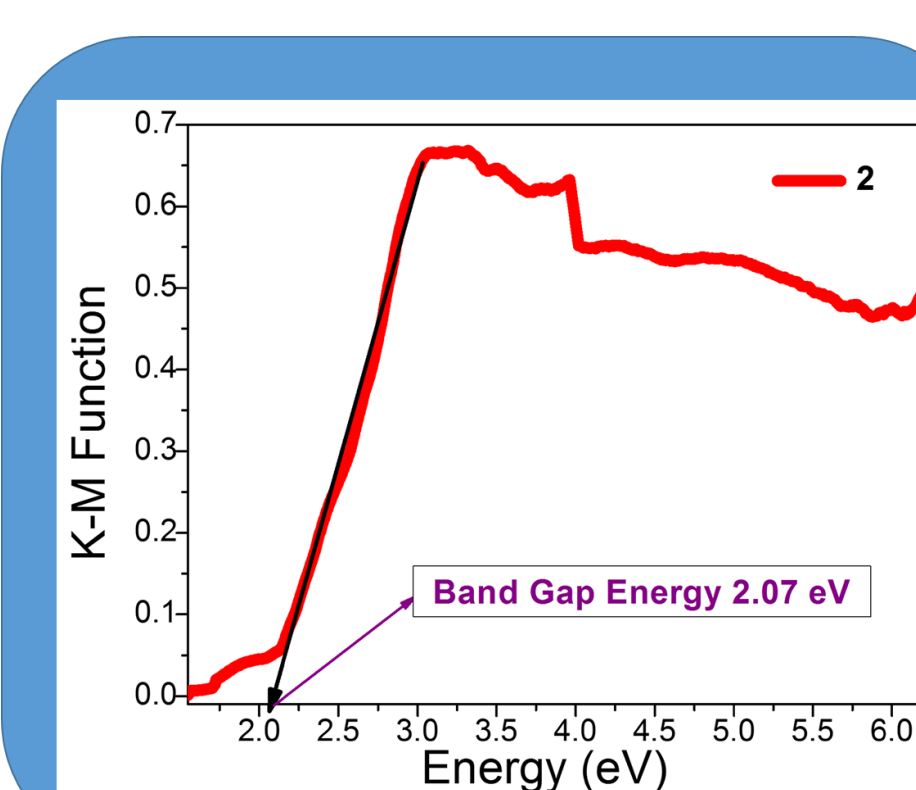
UV-Vis spectra of degradation MB dye



Comparison of the decomposition rate of MB



Comparison PXRD patterns of **2**



Band gap energy plot of **2**

Catalytic activity of **2** was evaluated for the heterogeneous photocatalytic decolorization of methylene blue (MB) dye by 2-3 drops of 30% H₂O₂ solution at ambient temperature. In the typical experiment, 100 mL glass reactor was charged with 50 mL aqueous MB solution (1 × 10⁻⁵ M) and the 15 mg photocatalyst (**2**) was dispersed. The reaction was illuminated by a tungsten filament lamp. Stirring was maintained throughout the reaction and 1 mL aliquot was withdrawn every 30 min which was then centrifuged and analyzed by absorption spectrophotometer.

Acknowledgments

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References:

- Rachuri, Y. et al, *J. Solid State Chem.*, **2014**, DOI:10.1016/j.jssc.2014.05.012.
- Rachuri, Y. et al, *Cryst. Growth Des.*, **2014**, *14*, 3300–3308.
- Rachuri, Y. et al, *Inorg. Chem. Front.*, **2015**, DOI: 10.1039/C4QI00175C.
- Bisht, K. K.; Suresh, E. *J. Am. Chem. Soc.* **2013**, *135*, 15690–15693.
- Nenoff, T. M., *Chem. Mater.*, **2013**, *25*, 2591.
- Cui, Y. et al, *Adv. Mater.*, **2010**, *22*, 4112.