# MOISTURE RESISTANT CYCLODEXTRIN-BASED METAL-ORGANIC FRAMEWORKS (MOFS) WITH ENCAPSULATION OF DYES FOR OPTICAL APPLICATIONS

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## INTRODUCTION

Porous materials, such as Metal–Organic Frameworks (MOFs)[1] have been widely known for their characteristics as coordination compound materials because of their high surface area, high porosity, tunability, etc. Especially natural and renewable cyclodextrin MOFs (CD-MOFs), have opened a new channel of research in light of their non-toxic, edible, and renewable characteristics, which led to their applications into numerous directions including drug delivery, sensors, food packaging, electrical conductors.

Based on this, it was reported[2] that novel core-shell structured CD-MOFs based on epitaxial seed growth and layered by different dyes can achieve multi-color luminescence, but unfortunately, CD-MOFs which rapidly disintegrate when exposed to humid conditions, the practical applications face serious challenges and even are hampered in many cases by their moisture-sensitive nature.

Here, we report on the optimized synthesis of water-stabilized CD-MOF nanoparticles with cholesterol via surface modification by esterification. In addition, moisture resistant MOFs can be used to load dyes, which makes them potentially useful as nanocarriers for optical applications.

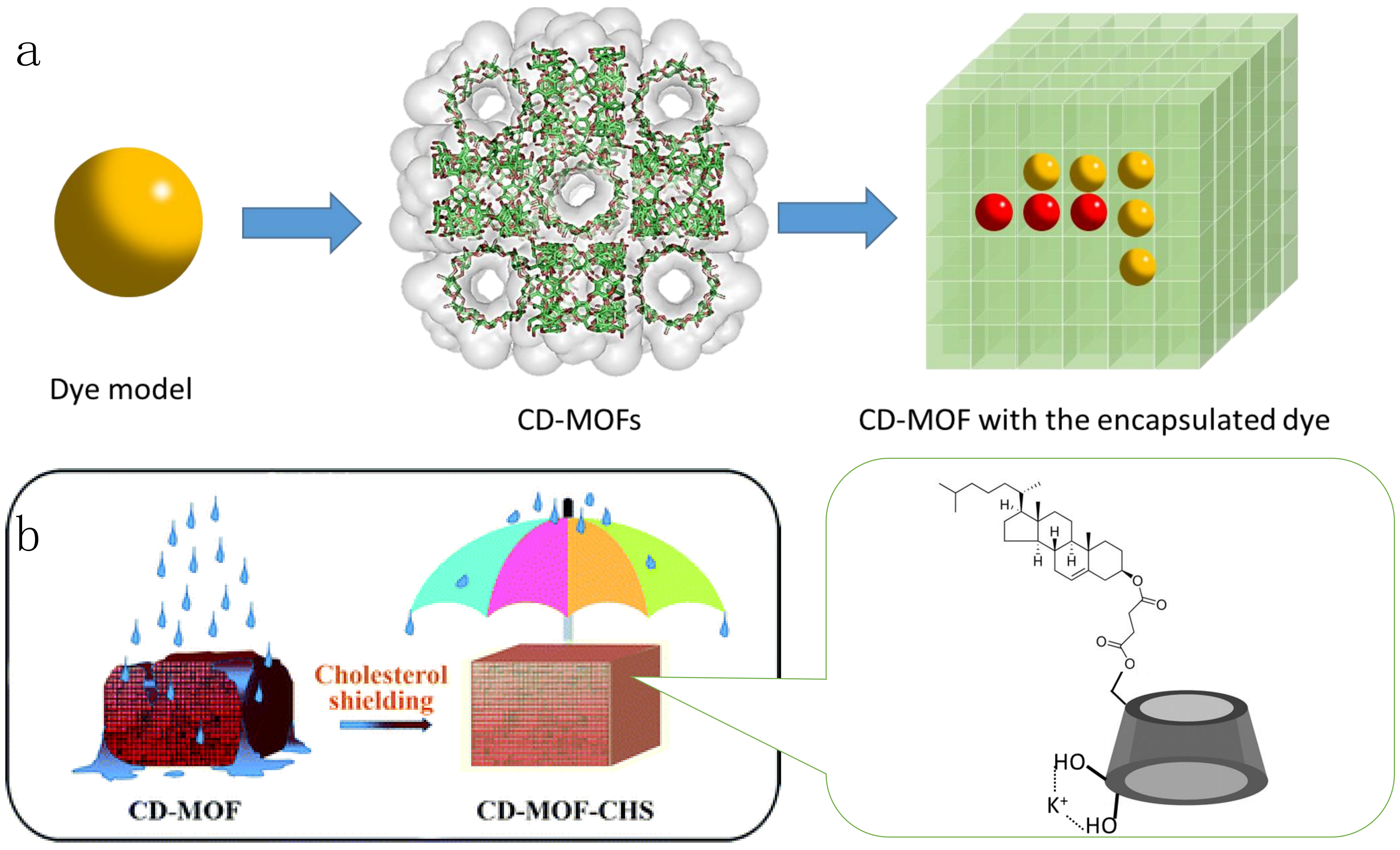


**Figure 1.** (a) Preparation of relative dye@CD-MOFs by the vapor-diffusion method. Representation of the extended solid-state structure of γ-CD-MOF ,crystallographic data are referenced[3]; (b) Schematic illustration of CD-MOF surface modification by cholesterol (CHS) (Pictures is referenced[4]. )

## RESULTS

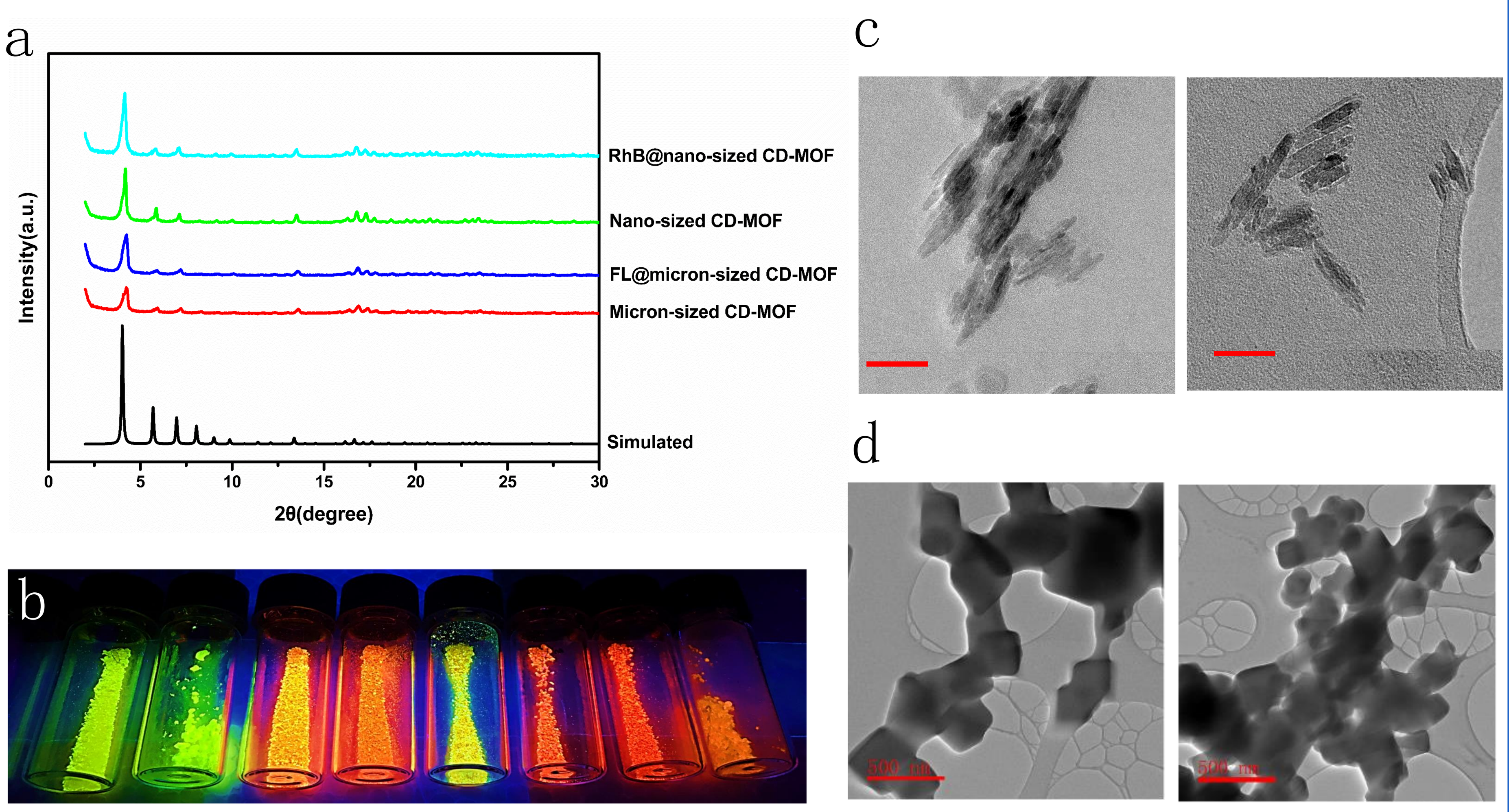


**Figure 2**. (a) Simulated crystallographic diffraction pattern of nano CD-MOF (simulated from available single crystal structure from the Cambridge structural database, CCDC 773709) and obtained X-ray powder diffraction patterns; (b) photographs of the prepared nano CD-MOFs when placed under a laboratory UV lamp (302 nm); (c) TEM images of nano CD-MOF dispersed in water and (d) TEM images of nano CD-MOF dispersed in cyclohexane.

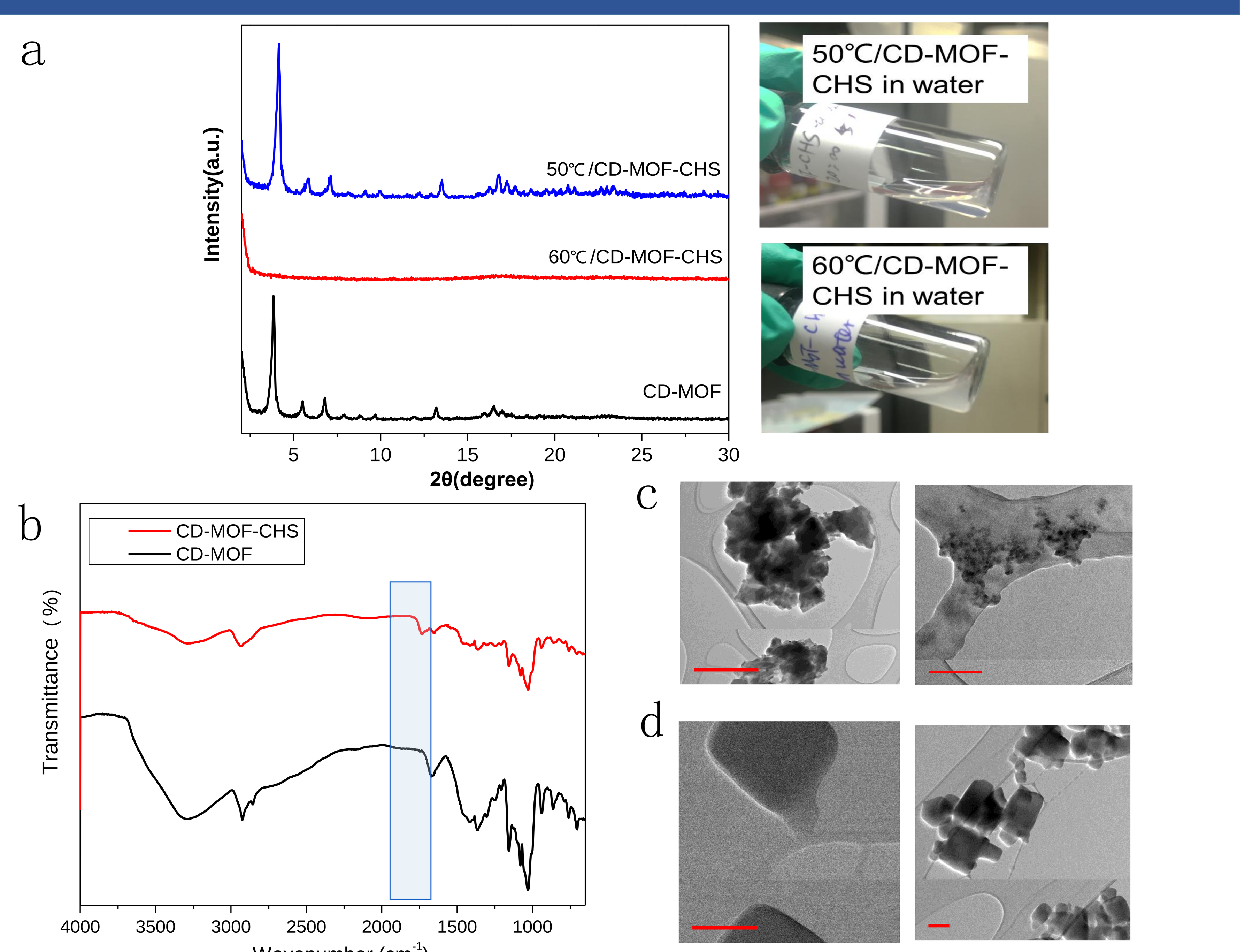


**Figure 3**. (a) X-ray powder diffraction patterns and the status dispersed in water of CD-MOF-CHS at 50℃ and 60℃ ; (b) FTIR spectra of CD-MOF-CHS ; (c)TEM images of nano CD-MOF-CHS dispersed in water and (d) TEM images of nano CD-MOF-CHS dispersed in cyclohexane.

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