Poster

The Development and Application of 3D ED method in Crystalline Porous Materials

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As a family of functional materials with ordered pores, including zeolites, metal–organic frameworks (MOFs) and covalent-organic frameworks (COFs), crystalline porous materials have presented a wide range of applications in adsorption/separation, electrochemistry and storage, etc [1-3]. The synthesis of novel crystalline porous materials with superior performance requires a comprehensive understanding of their crystal structures at atomic level, thereby establishing reliable structure-property relationships. One of the pressing challenges in this field is the precise structure determination of crystalline porous materials. By applying 3- dimensional electron diffraction (3D ED, Fig. 1a) [4-7], different phases of materials could be identified and classified, and *ab initio* single crystal structure solution could be achieved.

New developments in the 3D ED method, such as automated data collection and high-throughput data processing and analysis, have enabled it to be a more powerful tool in crystalline porous materials structure characterization, which has provided extensive successful examples of crystal structure determination including zeolites/silicates, MOFs and COFs (Fig. 1b) [8, 9].

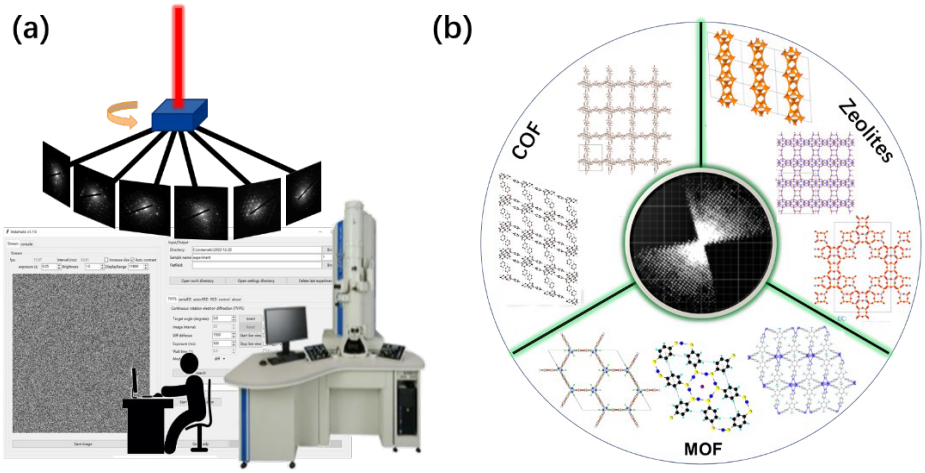

Figure 1. (a) A schematic diagram of 3D ED (top), with a user interface and a diagram of TEM microscope (bottom). (b) Examples of crystal structures resolved by 3D ED method.

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