

Development of metal-organic frameworks for biomedical applications – a review

ABSTRACT

Metal-organic frameworks (MOFs) are porous materials made from coordination bonding of organic linkers and metal nodes. Nowadays, MOFs have already achieved a considerable growth in many fields including in bio-related applications. In this review, we focus on the alternative, green route of MOFs synthesis as well as their toxicological properties. We also highlighted the potential of MOFs as therapeutic agents and nano-MOFs (NMOFs) for biomedical sensing. Water as an alternative media for MOF synthesis showed excellent results in term of particle size, stability and selectivity. Toxicological assessments revealed Fe (III) and MIL-100 as the most promising metal and MOF for medical applications. It was also shown that MOFs are sensitive towards physiological and pathological criteria such as pH, fluorescence and O₂. Although many attempts have been made in utilizing MOFs for bio applications, further improvements should be considered before MOFs can become effective therapeutics options.

Keyword: Metal-organic framework; Green synthesis; Toxicity; Biomedical; Biosensing