

Contents

Acknowledgments — V

List of contributors — IX

Muhammad Pervaiz, Talha Mumtaz, Arooj Ather, Zohaib Saeed, Umer Younas,
Rana Rashad Mahmood Khan, Ikram Ahmad, Syed Majid Bukhari,
Ayoub Rashid, Ahmad Adnan

1 Metal-organic framework introduction — 1

Muhammad Pervaiz, Talha Mumtaz, Zohaib Saeed,
Umer Younas, Ikram Ahmad, Shahzad Shareef, Ayoub Rashid,
Syed Mohsin Ali Naqvi, Ahmad Adnan

2 Metal-organic framework properties — 13

Naqeeb Ullah, Talha Mumtaz, Muhammad Pervaiz, Zohaib Saeed,
Umer Younas, Ikram Ahmad, Asma Zaidi, Ayoub Rashid, Ahmad Adnan

3 Metal-organic framework for heterogeneous catalysis — 21

Talha Mumtaz, Rizwan Sikanadar, Arooj Ather, Muhammad Shahzeb,
Hazqail Umar Khan, Muhammad Pervaiz

4 Homogeneous catalysis using MOFs — 29

Zoya Mazhar, Fareeha Andleeb, Rana Rashad Mahmood Khan,
Muhammad Pervaiz, Ayoub Rashid Ch., Hafiz Muhammad Faizan Haider,
Ahmad Adnan

5 MOF: an emerging material for biomedical applications — 35

Ramsha Saleem, Rana Rashad Mahmood Khan, Bisma Khanam,
Ayoub Rashid Ch., Muhammad Pervaiz, Zohaib Saeed, Ahmad Adnan

6 Pharmaceutical wastes: an overview — 51

Hoorish Qamar, Rana Rashad Mahmood Khan, Ramsha Saleem,
Muhammad Pervaiz, Nazir Ahmad, Hafiz Muhammad Faizan Haider,
Ahmad Adnan

7 Recent advancement and development in MOF-based materials for the removal of pharmaceutical waste — 73

VIII — Contents

Aqmar-ur-rehman, Rana Rashad Mahmood Khan, Hoorish Qamar,
Ramsha Saleem, Yussra Naeem, Ayoub Rashid Ch., Aqib Adnan,
Muhammad Pervaiz

8 Future prospective of metal-organic frameworks for pharmaceutical wastes — 95

Muhammad Yahya Tahir, Awais Ahmad, Rafael Luque

9 MOF – a promising material for energy applications — 109

Sadia Muzammil, Awais Ahmad, Rafael Luque

10 Polymer-coated MOF for pharmaceutical waste removal — 137

Maryam Adil, Awais Ahmad, Rafael Luque

11 MOF-derived nanocomposites for the removal of ciprofloxacin — 157

Index — 177