**Supplementary Data**

**Table S1**: Recent studies reporting contamination of potentially toxic elements (PTEs) in different water sources (i) rivers/lakes/canals, (ii) groundwater/drinking water, (iii) city wastewater, and (iv) industrial water.

|  |  |  |  |
| --- | --- | --- | --- |
| **Metal** | **Country** | **Concentration (mg/L)** | **Reference** |
| **Rivers/lakes/canals** |
| Al | Dongting Lake, China | 1890 | (Long et al., 2021) |
| Fe | Dongting Lake, China | 26120 | (Long et al., 2021) |
| Zn | Dongting Lake, China | 53320 | (Long et al., 2021) |
| Cu | Dongting Lake, China | 9.1 | (Long et al., 2021) |
| Mo | Dongting Lake, China | 2.9 | (Long et al., 2021) |
| Ni | Dongting Lake, China | 1.7 | (Long et al., 2021) |
| Mn | Dongting Lake, China | 4986 | (Long et al., 2021) |
| Ba | Dongting Lake, China | 98.2 | (Long et al., 2021) |
| Pb | Dongting Lake, China | 21.4 | (Long et al., 2021) |
| Cr | Dongting Lake, China | 43.2 | (Long et al., 2021) |
| As | Dongting Lake, China | 42.6 | (Long et al., 2021) |
| Al | China | 9908 | (Tong et al., 2021) |
| As | China | 48.05 | (Tong et al., 2021) |
| Ba | China | 310 | (Tong et al., 2021) |
| Cd | China | 61.74 | (Tong et al., 2021) |
| Co | China | 42.49 | (Tong et al., 2021) |
| Cr | China | 624 | (Tong et al., 2021) |
| Cu | China | 1100 | (Tong et al., 2021) |
| Fe | China | 68479 | (Tong et al., 2021) |
| Mn | China | 2745 | (Tong et al., 2021) |
| Ni | China | 600 | (Tong et al., 2021) |
| Pb | China | 690 | (Tong et al., 2021) |
| Zn | China | 10600 | (Tong et al., 2021) |
| Cr | China | 5.81 | (Xu et al., 2021) |
| As | China | 1 | (Xu et al., 2021) |
| Cd | China | 0.1 | (Xu et al., 2021) |
| Pb | China | 5 | (Xu et al., 2021) |
| Zn | China | 50 | (Xu et al., 2021) |
| Cu | China | 10 | (Xu et al., 2021) |
| Ni | China | 2 | (Xu et al., 2021) |
| Hg | China | 0.1 | (Xu et al., 2021) |
| Cd | Pakistan | 3 | (Ahmad et al., 2021b) |
| Cr | Afghanistan | 0.02779 | (Zahidi et al., 2020) |
| Mn | Afghanistan | 0.017 | (Zahidi et al., 2020) |
| Fe | Afghanistan | 0.638 | (Zahidi et al., 2020) |
| Ni | Afghanistan | 0.00375 | (Zahidi et al., 2020) |
| Cu | Afghanistan | 0.03235 | (Zahidi et al., 2020) |
| Zn | Afghanistan | 0.05095 | (Zahidi et al., 2020) |
| Cd | Afghanistan | 0.00133 | (Zahidi et al., 2020) |
| Hg | Afghanistan | 0.000723 | (Zahidi et al., 2020) |
| Pb | Afghanistan | 0.00957 | (Zahidi et al., 2020) |
| As | Afghanistan | 0.002509 | (Zahidi et al., 2020) |
| As | Pakistan | 33 | (Ahmad et al., 2021b) |
| As | Pakistan | 33 | (Abbas et al., 2021) |
| Pb | Bangladesh | 0.05 | (Rahman et al., 2020) |
| Cd | Bangladesh | 0.005 | (Rahman et al., 2020) |
| Cd | Bangladesh | 0.05 | (Rahman et al., 2020) |
| Cr | India | 0.66 | (Rizwan et al., 2021) |
| Pb | India | 0.51 | (Rizwan et al., 2021) |
| Co | India | 1.21 | (Rizwan et al., 2021) |
| Fe | India | 0.39 | (Rizwan et al., 2021) |
| Mn | India | 0.97 | (Rizwan et al., 2021) |
| **Groundwater / drinking water** |
| As | Rayong Province, Thailand | 183 | (Nilkarnjanakul et al., 2022) |
| Mg | Rayong Province, Thailand | 49 | (Varol et al., 2021) |
| Na | Rayong Province, Thailand | 39 | (Varol et al., 2021) |
| K | Rayong Province, Thailand | 69 | (Varol et al., 2021) |
| Fe | Rayong Province, Thailand | 5 | (Varol et al., 2021) |
| As | Rayong Province, Thailand | 36 | (Varol et al., 2021) |
| B | Rayong Province, Thailand | 1.55 | (Varol et al., 2021) |
| Al | China | 800 | (Tong et al., 2021) |
| As | China | 262.43 | (Tong et al., 2021) |
| Ba | China | 733 | (Tong et al., 2021) |
| Cd | China | 15 | (Tong et al., 2021) |
| Co | China | 60 | (Tong et al., 2021) |
| Cr | China | 50 | (Tong et al., 2021) |
| Cu | China | 223 | (Tong et al., 2021) |
| Fe | China | 3071 | (Tong et al., 2021) |
| Mn | China | 1300 | (Tong et al., 2021) |
| Ni | China | 62 | (Tong et al., 2021) |
| Pb | China | 136.50 | (Tong et al., 2021) |
| Zn | China | 7400 | (Tong et al., 2021) |
| Cd | Arba Minch, Ethiopia | 0.005 | (Guadie et al., 2021) |
| Cu | Arba Minch, Ethiopia | 0.02 | (Guadie et al., 2021) |
| Fe | Arba Minch, Ethiopia | 2.13 | (Guadie et al., 2021) |
| Mn | Arba Minch, Ethiopia | 0.12 | (Guadie et al., 2021) |
| Pb | Arba Minch, Ethiopia | 0.4 | (Guadie et al., 2021) |
| Zn | Arba Minch, Ethiopia | 0.12 | (Guadie et al., 2021) |
| Cd | China | 0.05825 | (Jiang et al., 2021a) |
| Cr | China | 982.6 | (Jiang et al., 2021a) |
| As | China | 163.8 | (Jiang et al., 2021a) |
| Mn | China | 524.27 | (Jiang et al., 2021a) |
| Fe | China | 1050.84 | (Jiang et al., 2021a) |
| Cu | China | 68.27 | (Jiang et al., 2021a) |
| Zn | China | 257.3 | (Jiang et al., 2021a) |
| Pb | China | 72.84 | (Jiang et al., 2021a) |
| Al | Qorveh, Iran | 8 | (Maleki and Jari, 2021) |
| As | Qorveh, Iran | 54 | (Maleki and Jari, 2021) |
| Cd | Qorveh, Iran | 0.2 | (Maleki and Jari, 2021) |
| Co | Qorveh, Iran | 2 | (Maleki and Jari, 2021) |
| Cr | Qorveh, Iran | 10 | (Maleki and Jari, 2021) |
| Cu | Qorveh, Iran | 28 | (Maleki and Jari, 2021) |
| Fe | Qorveh, Iran | 316 | (Maleki and Jari, 2021) |
| Hg | Qorveh, Iran | 1 | (Maleki and Jari, 2021) |
| Mn | Qorveh, Iran | 12 | (Maleki and Jari, 2021) |
| Mo | Qorveh, Iran | 0.3 | (Maleki and Jari, 2021) |
| Ni | Qorveh, Iran | 0.4 | (Maleki and Jari, 2021) |
| Pb | Qorveh, Iran | 2 | (Maleki and Jari, 2021) |
| Sb | Qorveh, Iran | 0.5 | (Maleki and Jari, 2021) |
| Se | Qorveh, Iran | 29 | (Maleki and Jari, 2021) |
| Zn | Qorveh, Iran | 107 | (Maleki and Jari, 2021) |
| Sn | Qorveh, Iran | 18 | (Maleki and Jari, 2021) |
| Al | Qorveh, Iran | 8 | (Maleki and Jari, 2021) |
| As | Qorveh, Iran | 47 | (Maleki and Jari, 2021) |
| Cd | Qorveh, Iran | 0.2 | (Maleki and Jari, 2021) |
| Co | Qorveh, Iran | 0.2 | (Maleki and Jari, 2021) |
| Cr | Qorveh, Iran | 53 | (Maleki and Jari, 2021) |
| Cu | Qorveh, Iran | 27 | (Maleki and Jari, 2021) |
| Fe | Qorveh, Iran | 240 | (Maleki and Jari, 2021) |
| Hg | Qorveh, Iran | 0.4 | (Maleki and Jari, 2021) |
| Mn | Qorveh, Iran | 6.7 | (Maleki and Jari, 2021) |
| Mo | Qorveh, Iran | 0.3 | (Maleki and Jari, 2021) |
| Ni | Qorveh, Iran | 5.3 | (Maleki and Jari, 2021) |
| Pb | Qorveh, Iran | 0.4 | (Maleki and Jari, 2021) |
| Sb | Qorveh, Iran | 0.6 | (Maleki and Jari, 2021) |
| Se | Qorveh, Iran | 20 | (Maleki and Jari, 2021) |
| Zn | Qorveh, Iran | 65 | (Maleki and Jari, 2021) |
| Sn | Qorveh, Iran | 2 | (Maleki and Jari, 2021) |
| Al | Bijar, Iran | 30 | (Maleki and Jari, 2021) |
| As | Bijar, Iran | 26 | (Maleki and Jari, 2021) |
| Cd | Bijar, Iran | 0.2 | (Maleki and Jari, 2021) |
| Co | Bijar, Iran | 1 | (Maleki and Jari, 2021) |
| Cr | Bijar, Iran | 11 | (Maleki and Jari, 2021) |
| Cu | Bijar, Iran | 27 | (Maleki and Jari, 2021) |
| Fe | Bijar, Iran | 54 | (Maleki and Jari, 2021) |
| Hg | Bijar, Iran | 1 | (Maleki and Jari, 2021) |
| Mn | Bijar, Iran | 0.2 | (Maleki and Jari, 2021) |
| Mo | Bijar, Iran | 0.3 | (Maleki and Jari, 2021) |
| Ni | Bijar, Iran | 0.4 | (Maleki and Jari, 2021) |
| Pb | Bijar, Iran | 4 | (Maleki and Jari, 2021) |
| Sb | Bijar, Iran | 0.6 | (Maleki and Jari, 2021) |
| Se | Bijar, Iran | 24 | (Maleki and Jari, 2021) |
| Zn | Bijar, Iran | 88 | (Maleki and Jari, 2021) |
| Sn | Bijar, Iran | 14 | (Maleki and Jari, 2021) |
| Al | Bijar, Iran | 27 | (Maleki and Jari, 2021) |
| As | Bijar, Iran | 27 | (Maleki and Jari, 2021) |
| Cd | Bijar, Iran | 0.2 | (Maleki and Jari, 2021) |
| Co | Bijar, Iran | 0.7 | (Maleki and Jari, 2021) |
| Cr | Bijar, Iran | 9.2 | (Maleki and Jari, 2021) |
| Cu | Bijar, Iran | 27 | (Maleki and Jari, 2021) |
| Fe | Bijar, Iran | 27 | (Maleki and Jari, 2021) |
| Hg | Bijar, Iran | 1 | (Maleki and Jari, 2021) |
| Mn | Bijar, Iran | 0.2 | (Maleki and Jari, 2021) |
| Mo | Bijar, Iran | 0.3 | (Maleki and Jari, 2021) |
| Ni | Bijar, Iran | 0.2 | (Maleki and Jari, 2021) |
| Pb | Bijar, Iran | 7 | (Maleki and Jari, 2021) |
| Sb | Bijar, Iran | 0.6 | (Maleki and Jari, 2021) |
| Se | Bijar, Iran | 19 | (Maleki and Jari, 2021) |
| Zn | Bijar, Iran | 66 | (Maleki and Jari, 2021) |
| Sn | Bijar, Iran | 12 | (Maleki and Jari, 2021) |
| As | Divandare, Iran | 1 | (Maleki and Jari, 2021) |
| Cd | Divandare, Iran | 0.2 | (Maleki and Jari, 2021) |
| Cr | Divandare, Iran | 5 | (Maleki and Jari, 2021) |
| Cu | Divandare, Iran | 0.23 | (Maleki and Jari, 2021) |
| Fe | Divandare, Iran | 49 | (Maleki and Jari, 2021) |
| Pb | Divandare, Iran | 5 | (Maleki and Jari, 2021) |
| Se | Divandare, Iran | 13 | (Maleki and Jari, 2021) |
| Zn | Divandare, Iran | 55 | (Maleki and Jari, 2021) |
| As | Divandare, Iran | 1 | (Maleki and Jari, 2021) |
| Cd | Divandare, Iran | 0.2 | (Maleki and Jari, 2021) |
| Cr | Divandare, Iran | 10 | (Maleki and Jari, 2021) |
| Cu | Divandare, Iran | 9.5 | (Maleki and Jari, 2021) |
| Fe | Divandare, Iran | 67 | (Maleki and Jari, 2021) |
| Pb | Divandare, Iran | 14.3 | (Maleki and Jari, 2021) |
| Se | Divandare, Iran | 12 | (Maleki and Jari, 2021) |
| Zn | Divandare, Iran | 28 | (Maleki and Jari, 2021) |
| Zn | Kenya | 0.73 | (Ochiba, 2020) |
| Pb | Kenya | 0.42 | (Ochiba, 2020) |
| Hg | Kenya | 0.0019 | (Ochiba, 2020) |
| Mn | Kenya | 0.26 | (Ochiba, 2020) |
| Cd | Kenya | 0.001 | (Ochiba, 2020) |
| Cr | Kenya | 0.005 | (Ochiba, 2020) |
| Cr | Pakistan | 0.38 | (Rashid et al., 2021) |
| Ni | Pakistan | 0.26 | (Rashid et al., 2021) |
| Cd | Pakistan | 0.08 | (Rashid et al., 2021) |
| Mn | Pakistan | 0.27 | (Rashid et al., 2021) |
| Cu | Pakistan | 0.36 | (Rashid et al., 2021) |
| Pb | Pakistan | 0.22 | (Rashid et al., 2021) |
| Co | Pakistan | 0.04 | (Rashid et al., 2021) |
| Fe | Pakistan | 0.86 | (Rashid et al., 2021) |
| Zn | Pakistan | 0.43 | (Rashid et al., 2021) |
| As | Pakistan | 10 | (Murtaza et al., 2020b) |
| As | Pakistan | 11 | (Murtaza et al., 2020b) |
| As | Pakistan | 50 | (Murtaza et al., 2020b) |
| As | Pakistan | 46.9 | (Sarwar et al., 2020) |
| As | Pakistan | 121.7 | (Bibi et al., 2021) |
| Pb | Pakistan | 0.14 | (Khalid et al., 2020) |
| Cd | Pakistan | 0.01 | (Khalid et al., 2020) |
| Ni | Pakistan | 0.09 | (Khalid et al., 2020) |
| Cu | Pakistan | 0.31 | (Khalid et al., 2020) |
| Mn | Pakistan | 0.94 | (Khalid et al., 2020) |
| Fe | Pakistan | 1.67 | (Khalid et al., 2020) |
| Zn | Pakistan | 2.63 | (Khalid et al., 2020) |
| Cd | India | 0.07 | (Idrees et al., 2018) |
| Cd | Egypt | 0.01 | (Abdalla and Khalil, 2018) |
| As | Pakistan | 46.8 | (Murtaza et al., 2020a) |
| As | Pakistan | 75 | (Murtaza et al., 2020a) |
| As | Pakistan | 51.4 | (Murtaza et al., 2020a) |
| Cd | Pakistan | 100 | (Abbas et al., 2021) |
| Pb | Pakistan | 100 | (Abbas et al., 2021) |
| As | Pakistan | 33 | (Abbas et al., 2021) |
| Pb | Malaysia | 0.005 | (Zainol et al., 2021) |
| Fe | Malaysia | 6.035 | (Zainol et al., 2021) |
| Cu | Malaysia | 0.002 | (Zainol et al., 2021) |
| Ni | Malaysia | 0.003 | (Zainol et al., 2021) |
| Cd | Malaysia | 0.001 | (Zainol et al., 2021) |
| Cr | Malaysia | 0.001 | (Zainol et al., 2021) |
| Zn | Malaysia | 0.023 | (Zainol et al., 2021) |
| Zn | Nigeria | 3.93 | (Ganiyu et al., 2021) |
| Pb | Nigeria | 0.65 | (Ganiyu et al., 2021) |
| Cd | Nigeria | 0.50 | (Ganiyu et al., 2021) |
| Fe | Nigeria | 1.69 | (Ganiyu et al., 2021) |
| Ni | Italy | 0.08 | (Nigro et al., 2017) |
| Ni | Finland | 1.48 | (Heikkinen et al., 2002) |
| Mn | Nigeria | 0.03 | (Ganiyu et al., 2021) |
| Fe | Bangladesh | 5.702 | (Islam and Mostafa, 2021) |
| Cr | Bangladesh | 0.031 | (Islam and Mostafa, 2021) |
| Mn | Bangladesh | 1.614 | (Islam and Mostafa, 2021) |
| Co | Bangladesh | 0.0325 | (Islam and Mostafa, 2021) |
| Cd | Bangladesh | 0.0019 | (Islam and Mostafa, 2021) |
| Pb | Bangladesh | 0.043 | (Islam and Mostafa, 2021) |
| Cu | Bangladesh | 1.07 | (Islam and Mostafa, 2021) |
| B | Bangladesh | 0.866 | (Islam and Mostafa, 2021) |
| Zn | Bangladesh | 1.50 | (Islam and Mostafa, 2021) |
| Cd | Yemen | 0.001 | (Alansi et al., 2021) |
| Fe | Yemen | 0.28 | (Alansi et al., 2021) |
| Ni | Yemen | 0.002 | (Alansi et al., 2021) |
| Pb | Yemen | 0.1 | (Alansi et al., 2021) |
| Zn | Yemen | 0.048 | (Alansi et al., 2021) |
| Co | Yemen | 0.002 | (Alansi et al., 2021) |
| Mn | Yemen | 0.05 | (Alansi et al., 2021) |
| Cu | Yemen | 0.03 | (Alansi et al., 2021) |
| Cr | China | 0.05825 | (Zhang and Wang, 2021) |
| Cu | China | 0.26878 | (Zhang and Wang, 2021) |
| Zn | China | 0.0298 | (Zhang and Wang, 2021) |
| Ni | China | 0.2661 | (Zhang and Wang, 2021) |
| Cd | China | 0.252 | (Zhang and Wang, 2021) |
| Cr | China | 0.02154 | (Lou et al., 2017) |
| Zn | China | 0.05407 | (Lou et al., 2017) |
| Pb | Bangladesh | 0.023 | (Hossain et al., 2020) |
| Co | Bangladesh | 0.2482 | (Hossain et al., 2020) |
| Zn | Bangladesh | 0.015 | (Hossain et al., 2020) |
| Fe | Bangladesh | 0.345 | (Hossain et al., 2020) |
| Cu | Bangladesh | 0.0375 | (Hossain et al., 2020) |
| Mn | Bangladesh | 0.406 | (Hossain et al., 2020) |
| Cu | Pakistan | 2 | (Yaqub et al., 2021) |
| Cr | Pakistan | 1.35 | (Yaqub et al., 2021) |
| Co | Pakistan | 1.86 | (Yaqub et al., 2021) |
| Ni | Pakistan | 0.024 | (Jalees et al., 2021) |
| Zn | Pakistan | 0.028 | (Jalees et al., 2021) |
| Cd | Pakistan | 0.003 | (Jalees et al., 2021) |
| Cr | Pakistan | 3.981 | (Jalees et al., 2021) |
| Pb | Pakistan | 1.804 | (Jalees et al., 2021) |
| Pb | Nigeria | 0.05 | (Olagunju et al., 2020) |
| Cd | Nigeria | 0.04 | (Olagunju et al., 2020) |
| Cr | Nigeria | 0.02 | (Olagunju et al., 2020) |
| Ni | Nigeria | 0.03 | (Olagunju et al., 2020) |
| Cu | Nigeria | 0.05 | (Olagunju et al., 2020) |
| Fe | Nigeria | 0.06 | (Olagunju et al., 2020) |
| Zn | Nigeria | 0.08 | (Olagunju et al., 2020) |
| Cd | Indonesia | 0.002 | (Sholehhudin et al., 2021) |
| Zn | Indonesia | 0.020 | (Sholehhudin et al., 2021) |
| Mn | Indonesia | 1.80 | (Sholehhudin et al., 2021) |
| Cd | Nigeria | 0.012 | (Imam et al., 2021) |
| Co | Nigeria | 0.05 | (Imam et al., 2021) |
| Ni | Nigeria | 0.02 | (Imam et al., 2021) |
| As | China | 0.3 | (Luo et al., 2021) |
| As | Pakistan | 0.015 | (Maskooni et al., 2020) |
| Cd | Pakistan | 0.3036 | (Maskooni et al., 2020) |
| Zn | Pakistan | 4.06 | (Maskooni et al., 2020) |
| Cr | Pakistan | 0.4027 | (Maskooni et al., 2020) |
| Mn | Pakistan | 0.138 | (Maskooni et al., 2020) |
| As | Pakistan | 0.035 | (Aliaskari and Schäfer, 2021) |
| Mn | Nigeria | 63.45 | (Obasi and Akudinobi, 2020) |
| Pb | Nigeria | 11.42 | (Obasi and Akudinobi, 2020) |
| Cr | Nigeria | 14.60 | (Obasi and Akudinobi, 2020) |
| Ni | Nigeria | 1.26 | (Obasi and Akudinobi, 2020) |
| Cd | Nigeria | 15.67 | (Obasi and Akudinobi, 2020) |
| Ag | Nigeria | 6.06 | (Obasi and Akudinobi, 2020) |
| Hg | Nigeria | 2.60 | (Obasi and Akudinobi, 2020) |
| As | Nigeria | 4.13 | (Obasi and Akudinobi, 2020) |
| Co | Nigeria | 0.9 | (Obasi and Akudinobi, 2020) |
| Zn | Nigeria | 10.53 | (Obasi and Akudinobi, 2020) |
| As | India | 1.36 | (Poonia et al., 2021) |
| Cr | India | 33.80 | (Poonia et al., 2021) |
| Cd | Germany | 0.98 | (Kubier et al., 2020) |
| Cr | Morocco | 0.065 | (Lotfi et al., 2020) |
| Fe | Morocco | 0.45 | (Lotfi et al., 2020) |
| Cu | Morocco | 2.9 | (Lotfi et al., 2020) |
| Zn | Morocco | 3.39 | (Lotfi et al., 2020) |
| Cd | Arba Minch, Ethiopia | 0.6 | (Guadie et al., 2021) |
| Cu | Arba Minch, Ethiopia | 0.27 | (Guadie et al., 2021) |
| Fe | Arba Minch, Ethiopia | 6.6 | (Guadie et al., 2021) |
| Mn | Arba Minch, Ethiopia | 0.45 | (Guadie et al., 2021) |
| Pb | Arba Minch, Ethiopia | 1.8 | (Guadie et al., 2021) |
| Zn | Arba Minch, Ethiopia | 0.3 | (Guadie et al., 2021) |
| Pb | Vehari, Pakistan | 0.29 | (Sarwar et al., 2020) |
| Cd | Vehari, Pakistan | 0.03 | (Sarwar et al., 2020) |
| Ni | Vehari, Pakistan | 0.08 | (Sarwar et al., 2020) |
| Cu | Vehari, Pakistan | 1.18 | (Sarwar et al., 2020) |
| Mn | Vehari, Pakistan | 0.43 | (Sarwar et al., 2020) |
| Zn | Vehari, Pakistan | 1.24 | (Sarwar et al., 2020) |
| Fe | Vehari, Pakistan | 4.62 | (Sarwar et al., 2020) |
| **Industrial wastewater** |
| Pb | Tetrapak, Kenya | 29.5 | (Kinuthia et al., 2020) |
| Pb | Chief’s Camp, Kenya | 28.2 | (Kinuthia et al., 2020) |
| Pb | Davis & Shirtliff, Kenya | 24.2 | (Kinuthia et al., 2020) |
| Cr | Sinai, Kenya | 50.7 | (Kinuthia et al., 2020) |
| Cr | Chief’s Camp, Kenya | 9.8 | (Kinuthia et al., 2020) |
| Cd | Railways Lower, Kenya | 0.17 | (Kinuthia et al., 2020) |
| Cd | Davis & Shirtliff, Kenya | 0.13 | (Kinuthia et al., 2020) |
| Cd | Chief’s Camp, Kenya | 0.11 | (Kinuthia et al., 2020) |
| Ni | Railways Lower, Kenya | 21.1 | (Kinuthia et al., 2020) |
| Cu | Taian, China | 90 | (Kinuthia et al., 2020) |
| Zn | Taian, China | 75 | (Kinuthia et al., 2020) |
| Fe | Taian, China | 600 | (Kinuthia et al., 2020) |
| Cd | Gazipur and Savar industrial Zones, Bangladesh | 0.34 | (Jiku et al., 2021) |
| Cd | Gazipur and Savar industrial Zones, Bangladesh | 0.78 | (Jiku et al., 2021) |
| Cd | Gazipur and Savar industrial Zones, Bangladesh | 0.24 | (Jiku et al., 2021) |
| Cd | Gazipur and Savar industrial Zones, Bangladesh | 0.82 | (Jiku et al., 2021) |
| Cd | Gazipur and Savar industrial Zones, Bangladesh | 0.92 | (Jiku et al., 2021) |
| Cd | Gazipur and Savar industrial Zones, Bangladesh | 0.32 | (Jiku et al., 2021) |
| Cd | Gazipur and Savar industrial Zones, Bangladesh | 0.94 | (Jiku et al., 2021) |
| Cd | Gazipur and Savar industrial Zones, Bangladesh | 0.39 | (Jiku et al., 2021) |
| Cd | Gazipur and Savar industrial Zones, Bangladesh | 0.7 | (Jiku et al., 2021) |
| Cd | Gazipur and Savar industrial Zones, Bangladesh | 0.63 | (Jiku et al., 2021) |
| Pb | Gazipur and Savar industrial Zones, Bangladesh | 1.63 | (Jiku et al., 2021) |
| Pb | Gazipur and Savar industrial Zones, Bangladesh | 2.01 | (Jiku et al., 2021) |
| Pb | Gazipur and Savar industrial Zones, Bangladesh | 1.78 | (Jiku et al., 2021) |
| Pb | Gazipur and Savar industrial Zones, Bangladesh | 1.63 | (Jiku et al., 2021) |
| Pb | Gazipur and Savar industrial Zones, Bangladesh | 1.22 | (Jiku et al., 2021) |
| Pb | Gazipur and Savar industrial Zones, Bangladesh | 1.02 | (Jiku et al., 2021) |
| Pb | Gazipur and Savar industrial Zones, Bangladesh | 2.04 | (Jiku et al., 2021) |
| Pb | Gazipur and Savar industrial Zones, Bangladesh | 2.12 | (Jiku et al., 2021) |
| Pb | Gazipur and Savar industrial Zones, Bangladesh | 1.17 | (Jiku et al., 2021) |
| Fe | Gazipur and Savar industrial Zones, Bangladesh | 1.46 | (Jiku et al., 2021) |
| Fe | Gazipur and Savar industrial Zones, Bangladesh | 1.07 | (Jiku et al., 2021) |
| Fe | Gazipur and Savar industrial Zones, Bangladesh | 1.20 | (Jiku et al., 2021) |
| Fe | Gazipur and Savar industrial Zones, Bangladesh | 1.14 | (Jiku et al., 2021) |
| Fe | Gazipur and Savar industrial | 1.78 | (Jiku et al., 2021) |
| Mn | Gazipur and Savar industrial | 1.32 | (Jiku et al., 2021) |
| Mn | Gazipur and Savar industrial | 1.2 | (Jiku et al., 2021) |
| Cu | Gazipur and Savar industrial | 1.56 | (Jiku et al., 2021) |
| Cu | Gazipur and Savar industrial | 1.32 | (Jiku et al., 2021) |
| Cu | Gazipur and Savar industrial | 1.14 | (Jiku et al., 2021) |
| Cu | Gazipur and Savar industrial | 3.52 | (Jiku et al., 2021) |
| **City wastewater** |
| Cd | Arba Minch, Ethiopia | 0.6 | (Guadie et al., 2021) |
| Cu | Arba Minch, Ethiopia | 0.27 | (Guadie et al., 2021) |
| Fe | Arba Minch, Ethiopia | 6.6 | (Guadie et al., 2021) |
| Mn | Arba Minch, Ethiopia | 0.45 | (Guadie et al., 2021) |
| Pb | Arba Minch, Ethiopia | 1.8 | (Guadie et al., 2021) |
| Zn | Arba Minch, Ethiopia | 0.3 | (Guadie et al., 2021) |
| Pb | Vehari, Pakistan | 0.29 | (Sarwar et al., 2020) |
| Cd | Vehari, Pakistan | 0.03 | (Sarwar et al., 2020) |
| Ni | Vehari, Pakistan | 0.08 | (Sarwar et al., 2020) |
| Cu | Vehari, Pakistan | 1.18 | (Sarwar et al., 2020) |
| Mn | Vehari, Pakistan | 0.43 | (Sarwar et al., 2020) |
| Zn | Vehari, Pakistan | 1.24 | (Sarwar et al., 2020) |
| Fe | Vehari, Pakistan | 4.62 | (Sarwar et al., 2020) |

**Table S2**: Removal efficiency and/or adsorption capacity of various MOFs for potentially toxic metal(loid)-contaminated wastewaters.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Materials** | **Metal** | **Q** | **mg/g** | **pH** | **Reference** |
| CS grafted UiO-66-NH2 | Cu | − | 364.96 | − | (Hu et al., 2022) |
| CS grafted UiO-66-NH2 | Pb | − | 555.56 | − | (Hu et al., 2022) |
| Co-MOF | Ce | − | 93.3 | 1.01-5.1 | (Khalil et al., 2022) |
|  | Eu | − | 27.47 | 1.01-5.1 | (Khalil et al., 2022) |
| UiO-66-EDTMPA | Pb | − | 558.67 | − | (Yan et al., 2022) |
|  | Cd | − | 271.34 | − | (Yan et al., 2022) |
|  | Cu | − | 210.89 | − | (Yan et al., 2022) |
| Fe3O4@ZIF-8 | Pb | 98 | 719.42 | 1.0-7.0 | (Jiang et al., 2021b) |
| Fe3O4@ZIF-9 | Cu | 98 | 301.33 | 1.0-7.0 | (Jiang et al., 2021b) |
| Cu-MOF-74 | Cd | 95 | 150 | 6.5 | (Kim et al., 2021) |
| Zr-MOF | Cd | − | 37 | 3.0-9.0 | (Nimbalkar and Bhat, 2021) |
| Zr-MOF | Pb | − | 100 | 3.0-9.0 | (Nimbalkar and Bhat, 2021) |
| ZIF-8 | Pb | − | 700 | − | (Tanihara et al., 2021) |
| MoS4-MOF | Hg | 99.9 | − | − | (Yazdi et al., 2021) |
| MIL-53(Al)-1 | F | − | 75.5 | 1.0-12.0 | (Huang et al., 2021) |
| MIL-53(Al)-2 | F | − | 65 | 1.0-12.0 | (Huang et al., 2021) |
| MIL-53(Al)-3 | F | − | 69.6 | 1.0-12.0 | (Huang et al., 2021) |
| MIL-53(Al)-4 | F | − | 72.5 | 1.0-12.0 | (Huang et al., 2021) |
| MIL-53(Al)-5 | F | − | 50.27 | 1.0-12.0 | (Huang et al., 2021) |
| MIL-53(Al)-6 | F | − | 40.34 | 1.0-12.0 | (Huang et al., 2021) |
| MIL-53(Al)-7 | F | − | 35.63 | 1.0-12.0 | (Huang et al., 2021) |
| Fe-MIL-88NH2 | Pb | 72.5 | 250 | 3.0-7.0 | (Fu et al., 2021) |
| Zr-BTC | Fe | − | 5 | 2.0-12.0 | (Jeyaseelan et al., 2021) |
| Fe-BTC | Fe | − | 4.95 | 2.0-12.0 | (Jeyaseelan et al., 2021) |
| Al-BTC | Fe | − | 4.9 | 2.0-12.0 | (Jeyaseelan et al., 2021) |
| ZIF-8 | Pb | 96 | 1780 | 2.0-12.0 | (Ahmad et al., 2021a) |
| ZIF-67 | Pb | 99.5 | 1975 | 2.0-12.0 | (Ahmad et al., 2021a) |
| ZIF-8 | Hg | 93 | 1290 | 2.0-12.0 | (Ahmad et al., 2021a) |
| ZIF-67 | Hg | 94 | 1450 | 2.0-12.0 | (Ahmad et al., 2021a) |
| UiO-66-EDA | Pb | 99 | 243.9 | 2.0-9.0 | (Ahmadijokani et al., 2021) |
| UiO-66-EDA | Cd | 99 | 208.33 | 1.5-7.0 | (Ahmadijokani et al., 2021) |
| UiO-66-EDA | Cu | 99 | 217.39 | 1.5-7.0 | (Ahmadijokani et al., 2021) |
| Mag MOF-NH2 | U | 90.37 | 80 | 2.0-9.0 | (Chen et al., 2021) |
| Fe-MIL-88B | Sb | 95 | 566.1 | 2.0-9.0 | (Chen et al., 2021) |
| Fe-MIL-88B | Sb | 90 | 318.9 | 2.0-9.0 | (Chen et al., 2021) |
| UiO-66@ABs | Cr | 99 | 2.181 | 2.0-12.0 | (Daradmare et al., 2021) |
| TMU-81 | Cd | 98 | 526 | 4.0 | (Esrafili et al., 2021) |
| TMU-81 | Cu | 98 | 200 | 4.0 | (Esrafili et al., 2021) |
| TMU-81 | Cr | 98 | 270 | 4.0 | (Esrafili et al., 2021) |
| TMU-81 | Zn | 98 | 95 | 4.0 | (Esrafili et al., 2021) |
| TMU-81 | Pb | 98 | 60 | 4.0 | (Esrafili et al., 2021) |
| Cu-BTC | Pb | 85 | 230 | 2.0-6.0 | (Hasankola et al., 2019) |
| Cu-BTC | Hg | 35 | − | 2.0-6.0 | (Hasankola et al., 2019) |
| ZIF-67/BC/CH | Cu | − | 200 | 2.0-6.0 | (Li et al., 2020) |
| ZIF-8/PAN | Cu | 96.14 | 250 | 2.0-6.0 | (Li et al., 2020) |
| ZIF-8@SnO2@CoFe2O4 | Ni | 96.5 | 95 | 2.0-7.0 | (Roudbari et al., 2021) |
| PCN-221 | Hg | 98 | 375 | 2.0-10.0 | (Hasankola et al., 2020) |
| UiO-66 | Pb | 89 | − |  | (Lei et al., 2019) |
| ZIF-67@Fe3O4@ESM | Cu | 99 | 285 | 4.0-6.0 | (Mahmoodi et al., 2019) |
| Zn(Bim)(OAc)-NS | Cu | − | 325 | 1.0-13.0 | (Xu et al., 2020) |
| AMCA-MIL-53(Al) | Pb | 79.5 | 390 | 1.47-8.13 | (Alqadami et al., 2018) |
| melamine-MOFs | Pb | − | 122 | 2.0-6.0 | (Yin et al., 2018) |
| melamine-MOFs | Pb | − | 205 | 2.0-6.0 | (Yin et al., 2018) |
| MOF-808-EDTA | La | 99 | 205 | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Pr | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Nd | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Ce | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA |  Eu | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Gd | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Zr | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Fe | 99 | 170 | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Mn | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Hg | 99 | 592 | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Rh | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Ru | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Cd | 99 | 525 | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Pb | 99 | 313 | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Sn | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Zn | 99 | 210 | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA |  Cu | 99 | 180 | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Co | 99 | 190 | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Ni | 99 | 190 | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Pt | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA | Pd | 99 | − | 2.0 | (Peng et al., 2018) |
| MOF-808-EDTA |  Sb | 99 | − | 2.0 | (Peng et al., 2018) |
| ZIF-8 | Pb | 99 | 1119.8 | 5.1 | (Huang et al., 2018) |
| ZIF-67 | Pb | 99 | 1348.42 | 5.1 | (Huang et al., 2018) |
| ZIF-8 | Cu | 99 | 454.72 | 5.2 | (Huang et al., 2018) |
| ZIF-67 | Cu | 99 | 617.51 | 5.2 | (Huang et al., 2018) |
| Cu-MOFs/Fe3O4 | Pb | 96 | 219 | − | (Shi et al., 2018) |
| La-MGs | Sb | 92.1 | 897.6 | − | (You et al., 2022) |
| MOF-199@PANI, core@shell | Cu | − | 7831.34 | − | (Yuan et al., 2022a) |
| UiO-66-NH2 | Cu | − | 364.96 | − | (Hu et al., 2022) |
| UiO-66-NH2 | Pb | − | 555.56 | − | (Hu et al., 2022) |
| UiO-66-GMA | Pb | 92 | − | − | (Gul Zaman et al., 2022) |
| UiO-66-GMA | Cd | 94 | − | − | (Gul Zaman et al., 2022) |
| UiO-66-GMA | Cu | 96 | − | − | (Gul Zaman et al., 2022) |
| Fe3O4@C-GO-MOF | Pb | − | 344.83 | − | (Wang et al., 2022) |
| Dawsonite (NH2-MIL-53(Al)) | Cu | − | 228.25 | − | (Li et al., 2020) |
| Zr-MOFs | Cu | − | 59.8 | − | (Wang et al., 2018) |
| ZnO-NP@Zn-MOF-74 | Cu | − | 137.17 | − | (Guo et al., 2021) |
| Zr-MOF | Cu | − | 79.34 | − | (Subramaniyam et al., 2022) |
| ZIF-8 | Cu | − | 454.7 | − | (Huang et al., 2018) |
| ZIF-8@GO | Cu | − | 482.29 | − | (Li and Xu, 2021) |
| ZIF-8@GO | Pb | − | 1119.80 | − | (Li and Xu, 2021) |
| Fe3O4@ZIF-8 | Cu | − | 719.42 | − | (Jiang et al., 2021c) |
| Fe3O4@ZIF-8 | Pb | − | 301.33 | − | (Jiang et al., 2021c) |
| CelloZIFPaper | Cd | − | 143 | 4 | (Abdelhamid et al., 2022) |
| CelloZIFPaper | Cu | − | 354 | 4 | (Abdelhamid et al., 2022) |
| CelloZIFPaper | Fe | − | 260.8 | 4 | (Abdelhamid et al., 2022) |
| CelloZIFPaper | Pb | − | 307.3 | 4 | (Abdelhamid et al., 2022) |
| CelloZIFPaper | Co | − | 350 | 4 | (Abdelhamid et al., 2022) |
| CelloZIFPaper | Cd | − | 196.8 | 4 | (Abdelhamid et al., 2022) |
| CelloZIFPaper | Cu | − | 166.5 | 4 | (Abdelhamid et al., 2022) |
| CelloZIFPaper | Fe | − | 66.2 | 4 | (Abdelhamid et al., 2022) |
| CelloZIFPaper | Pb | − | 87.2 | 4 | (Abdelhamid et al., 2022) |
| CelloZIFPaper | Co | − | 300 | 4 | (Abdelhamid et al., 2022) |
| TMU-56 | Pb | − | 1130 | − | (Afshariazar et al., 2020) |
| TMU-23 | Pb | − | 434.7 | − | (Shayegan et al., 2020) |

**Table S3**: Removal capacity of various MOFs (2022 only) for PTE-contaminated wastewaters under varied pH levels.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MOF** | **Metal** | **R%** | **pH** | **Reference** |
| UiO-66-GMA | Pb | 22 | 1 | (Gul Zaman et al., 2022) |
| 35 | 2 |
| 45 | 3 |
| 68 | 4 |
| 80 | 5 |
| 92 | 6 |
| 78 | 7 |
| 75 | 8 |
| 70 | 9 |
| UiO-66-GMA | Cd | 32 | 1 | (Gul Zaman et al., 2022) |
| 43 | 2 |
| 58 | 3 |
| 75 | 4 |
| 92 | 5 |
| 96 | 6 |
| 90 | 7 |
| 82 | 8 |
| 80 | 9 |
| Zn-Ph-D CP | Cu | 68 | 5 | (Elewa et al., 2022) |
| 99 | 7 |
| 99 | 9 |
| Fe3O4@ZIF-8 | Cd | 23 | 4 | (Abdel-Magied et al., 2022) |
| 24 | 4.5 |
| 25.5 | 5 |
| 27 | 5.5 |
| 27.5 | 6 |
| Fe3O4@ZIF-8 | Pb | 33 | 4 | (Abdel-Magied et al., 2022) |
| 35 | 4.5 |
| 37 | 5 |
| 37 | 5.5 |
| 36.5 | 6 |
| Fe3O4@UiO-66–NH2 | Cd | 31 | 4 | (Abdel-Magied et al., 2022) |
| 32.5 | 4.5 |
| 33 | 5 |
| 34 | 5.5 |
| 35 | 6 |
| Fe3O4@UiO-66–NH2 | Pb | 36.5 | 4 | (Abdel-Magied et al., 2022) |
| 37 | 4.5 |
| 39 | 5 |
| 39.5 | 5.5 |
| 39.5 | 6 |
| UiO-66-EDA | Pb | 56 | 2 | (Ahmadijokani et al., 2021) |
| 73 | 3 |
| 90 | 4 |
| 95 | 5 |
| 97 | 6 |
| 99 | 7 |
| UiO-66-EDA | Cd | 59 | 2 | (Ahmadijokani et al., 2021) |
| 65 | 3 |
| 74 | 4 |
| 89 | 5 |
| 93 | 6 |
| 96 | 7 |
| UiO-66-EDA | Cu | 62 | 2 | (Ahmadijokani et al., 2021) |
| 68 | 3 |
| 76 | 4 |
| 79 | 5 |
| 92 | 6 |
| 96 | 7 |
| MFZ | Cd | 20 | 1 | (Li et al., 2022) |
| 25 | 2 |
| 31 | 3 |
| 52 | 4 |
| 75 | 5 |
| 88 | 6 |
| 99.9 | 7 |

**Table S4**: Removal capacity of various MOFs (2022 only) for PTE-contaminated wastewaters under varied exposure tomes (minutes).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **MOF** | **Metal** | **Adsorption mg/g** | **R%** | **Time** | **Reference** |
| UiO-66-GMA | Pb | 860 | 86 | 1 | (Gul Zaman et al., 2022) |
| 862 | 86 | 40 |
| 865 | 86 | 80 |
| 875 | 87 | 120 |
| 880 | 88 | 160 |
| 880 | 88 | 200 |
| UiO-66-GMA | Cd | 900 | 90 | 1 | (Gul Zaman et al., 2022) |
| 905 | 90.5 | 40 |
| 910 | 91 | 80 |
| 915 | 92 | 120 |
| 930 | 93 | 160 |
| 950 | 95 | 200 |
| CelloZIFPaper | Co | 100 |  | 1 | (Abdelhamid et al., 2022) |
| 150 | 5 |
| 160 | 10 |
| 200 | 25 |
| 350 | 50 |
| 350 | 200 |
| 350 | 300 |
| 350 | 700 |
| MOF(Zn-Ph-D-CP) | Cu |  | 59 | 1 | (Elewa et al., 2022) |
| 59 | 4 |
| 60 | 8 |
| 68 | 12 |
| 68 | 16 |
| 68 | 20 |
| 68 | 24 |
| UiO-66-Cl | Fe3+ | 1.5 |  | 20 | (Yuan et al., 2022b) |
| 2.5 | 40 |
| 3.5 | 60 |
| 4.5 | 90 |
| 5 | 120 |
| 5.5 | 150 |
| 6 | 180 |
| 6.2 | 240 |
| 6.4 | 360 |
| 6.5 | 480 |
| UiO-66-S | Fe3+ | 6.5 |  | 20 | (Yuan et al., 2022b) |
| 8.5 | 40 |
| 9.5 | 60 |
| 9.6 | 90 |
| 9.7 | 120 |
| 9.8 | 150 |
| 9.8 | 180 |
| 9.8 | 240 |
| 9.8 | 360 |
| 9.8 | 480 |
| Fe3O4@ZIF-8 | Cd | 7 |  | 5 | (Abdel-Magied et al., 2022) |
| 11 | 15 |
| 13 | 30 |
| 17.5 | 45 |
| 22 | 60 |
| 25 | 120 |
| 26 | 180 |
| 27.5 | 300 |
| 27.5 | 480 |
| 27.5 | 960 |
| 27.5 | 1200 |
| 27.5 | 1440 |
| Fe3O4@ZIF-8 | Pb | 8 |  | 5 | (Abdel-Magied et al., 2022) |
| 16 | 15 |
| 25 | 30 |
| 32 | 45 |
| 34 | 60 |
| 36 | 120 |
| 37 | 180 |
| 38 | 300 |
| 38 | 480 |
| 38 | 960 |
| 38 | 1200 |
| 38 | 1440 |
| Fe3O4@UiO-66–NH2 | Cd | 7 |  | 5 | (Abdel-Magied et al., 2022) |
| 13 | 15 |
| 16 | 30 |
| 20 | 45 |
| 23 | 60 |
| 31 | 120 |
| 33 | 180 |
| 34 | 300 |
| 35 | 480 |
| 35 | 960 |
| 35 | 1200 |
| 35 | 1440 |
| Fe3O4@UiO-66–NH2 | Pb | 7 |  | 5 | (Abdel-Magied et al., 2022) |
| 9 | 15 |
| 14 | 30 |
| 18 | 45 |
| 24 | 60 |
| 31 | 120 |
| 33 | 180 |
| 37 | 300 |
| 38 | 480 |
| 39 | 960 |
| 39 | 1200 |
| 39 | 1440 |
| UiO-66-EDA | Cu | 55 | 42 | 20 | (Ahmadijokani et al., 2021) |
| 60 | 46 | 40 |
| 70 | 55 | 60 |
| 78 | 68 | 80 |
| 85 | 72 | 100 |
| 95 | 78 | 120 |
| 100 | 81 | 140 |
| 101 | 82 | 160 |
| 102 | 83 | 180 |
| 103 | 84 | 200 |
| 104 | 85 | 220 |
| 105 | 86 | 240 |
| 106 | 87 | 260 |
| 107 | 88 | 280 |
| 108 | 88 | 300 |
| 109 | 88 | 320 |
| 110 | 89 | 340 |
| 110 | 89 | 360 |
| UiO-66-EDA | Cd | 52 | 48 | 20 | (Ahmadijokani et al., 2021) |
| 60 | 57 | 40 |
| 68 | 62 | 60 |
| 78 | 70 | 80 |
| 88 | 78 | 100 |
| 95 | 82 | 120 |
| 100 | 83 | 140 |
| 101 | 84 | 160 |
| 102 | 84 | 180 |
| 103 | 84 | 200 |
| 104 | 85 | 220 |
| 105 | 86 | 240 |
| 106 | 87 | 260 |
| 107 | 88 | 280 |
| 108 | 89 | 300 |
| 108 | 90 | 320 |
| 109 | 91 | 340 |
| 110 | 91 | 360 |
| UiO-66-EDA | Pb | 50 | 40 | 20 | (Ahmadijokani et al., 2021) |
| 56 | 45 | 40 |
| 62 | 48 | 60 |
| 75 | 59 | 80 |
| 79 | 62 | 100 |
| 95 | 72 | 120 |
| 100 | 78 | 140 |
| 108 | 85 | 160 |
| 114 | 91 | 180 |
| 115 | 92 | 200 |
| 116 | 93 | 220 |
| 120 | 94 | 240 |
| 121 | 95 | 260 |
| 121 | 95 | 280 |
| 122 | 96 | 300 |
| 122 | 96 | 320 |
| 123 | 97 | 340 |
| 123 | 97 | 360 |

**Table S5**: Removal capacity of various MOFs (2022 only) for PTE-contaminated wastewaters under varied MOF applied levels.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MOF** | **Metal** | **R%** | **MOF dose** | **Reference** |
| UiO-66-GMA | Pb | 78 | 0.5 | (Gul Zaman et al., 2022) |
| 92 | 1.0 |
| 96 | 1.5 |
| 95 | 2.0 |
| 94 | 2.5 |
| 94 | 3.0 |
| UiO-66-GMA | Cd | 74 | 0.5 | (Gul Zaman et al., 2022) |
| 86 | 1.0 |
| 94 | 1.5 |
| 95 | 2.0 |
| 94 | 2.5 |
| 94 | 3.0 |
| Zn-Ph-D CP | Cu | 85 | 0.005 | (Elewa et al., 2022) |
| 88 | 0.01 |
| 93 | 0.015 |
| UiO-66-EDA | Cu | 74 | 0.1 | (Ahmadijokani et al., 2021) |
| 76 | 0.4 |
| 78 | 0.6 |
| 80 | 0.75 |
| 83 | 1.0 |
| 84 | 1.5 |
| 87 | 2 |
| 90 | 3 |
| UiO-66-EDA | Cd | 80 | 0.1 | (Ahmadijokani et al., 2021) |
| 83 | 0.4 |
| 86 | 0.6 |
| 89 | 0.75 |
| 91 | 1.0 |
| 9235 | 1.5 |
| 94 | 2 |
| 97.5 | 3 |
| UiO-66-EDA | Pb | 81 | 0.1 | (Ahmadijokani et al., 2021) |
| 84 | 0.4 |
| 89 | 0.6 |
| 95.5 | 0.75 |
| 97 | 1.0 |
| 98 | 1.5 |
| 99 | 2 |
| 99.9 | 3 |

**Table S6**: Removal capacity of various MOFs (2022 only) for PTE-contaminated wastewaters under varied PTE levels.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **MOF** | **Metal** | **Adsorption mg/g** | **R%** | **PTE dose** | **Reference** |
| UiO-66-GMA | Pb | 10 |  | 10 | (Gul Zaman et al., 2022) |
| 100 | 50 |
| 260 | 100 |
| 310 | 200 |
| 380 | 300 |
| 385 | 500 |
| 390 | 750 |
| 400 | 1000 |
| UiO-66-GMA | Cd | 10 |  | 10 | (Gul Zaman et al., 2022) |
| 90 | 50 |
| 210 | 100 |
| 270 | 200 |
| 300 | 300 |
| 320 | 500 |
| 325 | 750 |
| 325 | 1000 |
| CelloZIFPape | Pb | 205 |  | 5 | (Abdelhamid et al., 2022) |
| 420 | 12 |
| 525 | 25 |
| 610 | 50 |
| 750 | 100 |
| MOF(Zn-Ph-D-CP) | Cu |  | 93 |  | (Elewa et al., 2022) |
| 92 |
| 94 |
| 95 |
| Fe3O4@ZIF-8 | Cd | 20 |  | 1 | (Abdel-Magied et al., 2022) |
| 28 | 2.5 |
| 80 | 8 |
| 120 | 18 |
| 140 | 28 |
| Fe3O4@ZIF-8 | Pb | 37 | 1 | (Abdel-Magied et al., 2022) |
| 70 | 2.5 |
| 160 | 8 |
| 205 | 18 |
| 230 | 28 |
| Fe3O4@UiO-66-NH2 | Cd | 28 | 1 | (Abdel-Magied et al., 2022) |
| 70 | 2.5 |
| 160 | 8 |
| 220 | 18 |
| 280 | 28 |
| Fe3O4@UiO-66-NH2 | Pb | 30 | 1 | (Abdel-Magied et al., 2022) |
| 80 | 2.5 |
| 200 | 8 |
| 270 | 18 |
| 320 | 28 |

**Table S7**: Alterations in surface area (m2/g) and pore volume (cm3/g) after postsynthetic functionalization of MOFs. Minus sign indicates % decrease.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **MOF** | **Functionalized-MOF** | **Functionalizing element** | **Before** | **After** | **% Change** | **Reference** |
| **Surface Area (m2/g)** | **Pore volume (cm3/g)** | **Surface Area (m2/g)** | **Pore volume (cm3/g)** | **Surface Area (m2/g)** | **Pore volume (cm3/g)** |
| UiO-66-NH2 | UiO-66-GMA | Glycidyl methacrylate (GMA) | 1127 | 0.48 | 1045 | 0.37 | -8 | -30 | (Molavi et al., 2018) |
| MIL-101(Cr) | MIL-101(Cr)- Cyanex | Bis(2,4,4-trimethylpentyl) phosphinic acid (Cyanex®-272) | 3341 | 1.80 | 442 | 0.19 | -656 | -847 | (Keshavarz et al., 2022) |
| MIL-101(Cr) | MIL-101(Cr)-HDEHP | Bis(2-ethylhexyl) hydrogen phosphate (D2EHPA or HDEHP) | 3341 | 1.80 | 1028 | 0.47 | -225 | -283 | (Keshavarz et al., 2022) |
| MIL-101(Cr) | MIL-101(Cr)-TBP | Tributyl phosphate (TBP) | 3341 | 1.80 | 1158 | 0.57 | -189 | -216 | (Keshavarz et al., 2022) |
| ZIF-8 | MFZ | Fe3O4 loading | 983.44 | 0.443 | 371.09 | 0.319 | -165 | -39 | (Li et al., 2022) |
| Zn-MOF | Zn-MOF-500 | Carbonization | 1.11 | 0.0031 | 18.57 | 0.0677 | 94 | 95 | (Zhang et al., 2022) |

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