**Supplementary Material**

**Effective adsorption of Hg(II) ions by new ethylene imine polymer/β-cyclodextrin crosslinked functionalized magnetic composite**

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**Table S1**

Langmuir and Freundlich isotherm parameters.

|  |  |  |
| --- | --- | --- |
| Models | Parameters | Value |
| Langmuir | *Q*m(cal) (mg g-1) | 352.11 |
| *K*L (min-1) | 1.02 |
| *R*2 | 0.9999 |
| Freundlich | *K*F | 239.07 |
| n | 12.20 |
| *R*2 | 0.9556 |

**Table S2**

Parameters of adsorption kinetic model.

|  |  |  |
| --- | --- | --- |
| Models | Parameters | Value |
| Pseudo-first-order  equation | *Q*e (cal) (mg/g) | 163.53 |
| *k*1 (min-1) | 0.0281 |
| *R*2 | 0.9685 |
| Pseudo-second-order  equation | *Q*e(cal) (mg/g) | 261.78 |
| *k*2 (g·mg-1·min-1) | 0.0004 |
| *R*2 | 0.9971 |

**Table S3**

Comparison of adsorption capacity of some nano adsorbents.

|  |  |  |
| --- | --- | --- |
| **Adsorbents** | **Q max (mg/g)** | **Refs.** |
| Silica-coated Fe3O4 nano particles | 148.80 | Girginova et al., 2010 |
| MCP | 247.51 | Sun et al., 2021 |
| MSP | 244.87 | Yang et al., 2021 |
| AEPE-hectorite | 54.70 | Phothitontimongkol et al., 2009 |
| CSTU resin | 135.00 | Monier and Abdel-Latif, 2012 |
| Fe3O4@SiO2@C-SH | 184.00 | Shi et al., 2018 |
| CNM | 164.22 | Awual et al., 2016 |
| ARSA | 270.2 | Naushad et al., 2015 |
| PDP | 222.2 | Zhuo et al., 2017 |
| This study (EIP-β-CD) | 248.72 | this work |



**Fig. S1** The plot depedence of ln(Kd) on 1/T

**Table S4**

Thermodynamic parameters at different temperatures

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| T (K) | 293 | 303 | 313 | 323 | 333 |
| ΔG0 (kJ/mol) | -12.30 | -11.15 | -10.00 | -8.85 | -7.70 |

notes：ΔH0= -46.025 kJ/mol，ΔS0= -115.092 J/mol·K.



**Fig. S2.** FT-IR spectra of samples. (1).EIP-β-CD (2).EIP-β-CD/Hg(II).