**From wastes to functions: Preparation of layered double hydroxides from industrial waste and its removal performance towards phosphates**

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***Supporting information for “*2.1. Chemicals and materials*”***



Fig. S1 The picture of raw calcium carbide slag powder (a) and red mud powder.

Table S1 The chemical composition of calcium carbide slag.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Component | CaO | Al2O3 | MgO | SiO2 | Fe2O3 | Others |
| Composition（*w*/%） | 89.94 | 2.81 | 0.14 | 5.69 | 0.29 | 1.13 |

Table S2 The chemical composition of red mud.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Component | CaO | Al2O3 | Na2O | SiO2 | Fe2O3 | Others |
| Composition（*w*/%） | 4.48 | 16.91 | 3.06 | 6.60 | 46.41 | 22.54 |

***Supporting information for “*2.2. Preparation of CR-LDH*”***



Fig. S2 Picture of CR-LDHs.

***Supporting information for “*3.2.7 Application of CR-LDH to practical phosphate-containing wastewater*”***



Fig. S3 Photos of practical phosphate-containing wastewater before CR-LDH adsorption (a) and after CR-LDH adsorption (b).

***Supporting information for “3.3* Adsorption mechanism*”***



Fig. S4 FT-IR pattern of CR-LDH before and after adsorption of phosphate.

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