**Supporting Information**

**Comparative study of the isothermal solid-state reaction systems of kaolinite-Na2CO3 and kaolinite-quartz-Na2CO3 for coal gangue activation**

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**Figures**

**Fig. S-1** XRD patterns of the as-received kaolinite.

**Fig. S-2** XRD patterns of Kln-Na2CO3 quasi-binary system (*No.* 1~9) and Kln-Qtz-Na2CO3 quasi-ternary system (*No*. 10~45) calcined at 850 °C

**Table**

**Table** S-1 PDF information referred to the defined phase



**Fig.S-1 XRD patterns of the as-received kaolinite**

**Table S-1 PDF information referred to the defined phases**

|  |  |  |  |
| --- | --- | --- | --- |
| Phase Name | Abbreviation | Chemical Formula | PDF Number |
| Kaolinite | Kln | Al2Si2O5(OH)4 | 02-189-6951 |
| Quartz | Qtz | SiO2 | 01-167-0146 |
| Sodium carbonate | Na | Na2CO3 | 01-164-1148 |
| Low-temperature carnegieite | L-phase | NaAlSiO4 | 96-101-0958 |
| Nepheline | Nep | NaAlSiO4 | 96-100-8762 |
| Zeolite | Zeo | NaAlSiO4 | 01-192-6489 |
| Sodium aluminum silicate-1 | SAS-1 | Na1.55Al1.55Si0.45O4 | 96-200-2895 |
| Sodium aluminum silicate-2 | SAS-2 | Na1.95Al1.95Si0.05O4 | 96-200-2892 |
| Sodium trisilicate | St | Na2Si3O7 | 01-164-1293 |
| Sodium metasilicate | Sm | Na2SiO3 | 00-016-0818 |
| Sodium pyrosilicate | Sp | Na6Si2O7 | 00-027-0784 |

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**Fig. S-2 XRD patterns of Kln-Na2CO3 quasi-binary system (*No*. 1~9) and Kln-Qtz-Na2CO3 quasi-ternary system (*No*. 10~45) calcined at 850 °C**