

4 - 3 Development of evaluation method for coal ash melting behavior considering the effect of gas composition.

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It is necessary for stable operation of coal gasifier, to evaluate melting characteristics of coal ash. It is said that melting behavior depends on coal brand, and melting characteristic in reducing atmosphere is different from that in oxidizing atmosphere even at the same brand. But the effect of reducing gas composition on melting behavior is not clarified. Therefore X-Ray Diffraction method (XRD) was applied to coal ash or slag samples prepared by heat treatment using tubular furnace, and following results were obtained.

1) Effect of ash preparation method

From the comparison of experimental results of ash gasified in CO₂ and ash burnt in air, it was clarified that preparation method effect on the melting behavior in reducing gas.

2) Evaluation of ash melting behavior by XRD

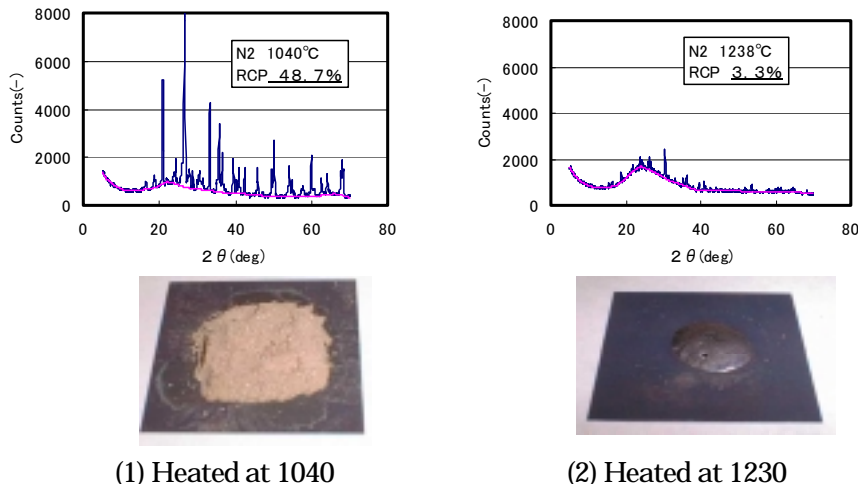
Ratio of crystalline phase, index processed from XRD data, described the state of melting at each temperature(Fig.1).

3) Effect of reducing gas composition

CO/CO₂ ratio of reducing gas didn't effect so much on melting behavior of coal ash, but addition of hydrogen seems to effect on melting behavior(Fig.2).

4) Effect of coal brand

Melting characteristics of 4 brands of coal was evaluated by this method.



(1) Heated at 1040

(2) Heated at 1230

Fig.1 Comparison of coal ash and XRD data in heating experiments

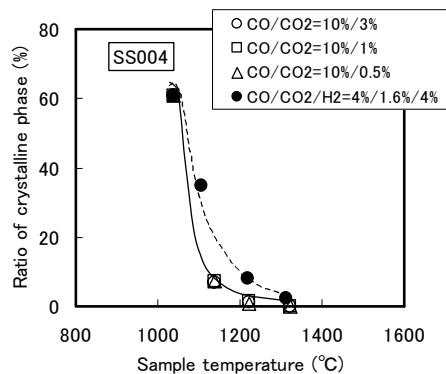


Fig.2 Effect of reducing gas composition on coal ash melting