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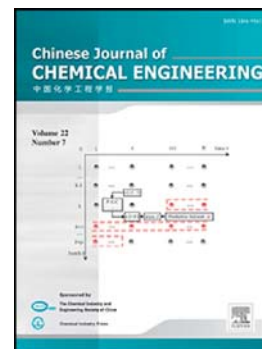
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Secondary Reactions Suppression for Fixed-bed coal Pyrolysis by Reducing Pressure and Mounting Internals*

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Suppressing Secondary Reactions of Coal Pyrolysis by Reducing Pressure and Mounting Internals in Fixed-bed Reactor*

Abstract Pyrolysis of Shenmu coal was performed in fixed-bed reactors indirectly heated by reducing operating pressure and mounting internals in the reactor to explore their synergetic effects on coal pyrolysis. Mounting internals particularly designed greatly improved the heat transfer inside coal bed and raised the yield of tar production. Reducing pressure further facilitated the production of tar through its suppression of secondary reactions occurring in the reactor. The absolute increase in tar yield reached 3.33 wt% in comparison with the pyrolysis in the reactor without internals under atmospheric pressure. The obtained tar yield in the reactor with internals under reduced pressure was even higher than the yield of Gray-King assay. Through experiments in a laboratory fixed bed reactor, it was also clarified that the effect of reducing pressure is related to volatile release rate in pyrolysis. It did not obviously vary tar yield at pyrolysis temperatures below 600 °C, while the effect was evident at 650 and 700 °C but became limited again above 800 °C. Under reduced pressure the produced tar contained more aliphatics and phenols but less aromatics.

Keywords pyrolysis, fixed-bed, reaction, coal, reducing pressure, internals

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