

Effect of occurrence mode of Hg on volatility during pyrolysis process

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Abstract

Coal utilization will not only discharge SO₂, nitrogen oxides (NO_x), CO₂ and other air pollutant, the harmful trace elements, such as Hg, contained in coal will be also released, which can cause environment pollution and further endangering human health. The release of Hg during coal combustion has been widely studied. However, pyrolysis as a critical initial reaction stage of combustion, the release of Hg during coal pyrolysis process has not received sufficient attention. In the present paper, two low rank coals with low and high sulfur content from China was pyrolyzed in a fixed bed reactor from room temperature at atmospheric pressure with the heating rate of 10 K/min, and the final pyrolysis temperature was from 400 to 800 °C with the interval of 100 °C. The release volatility of Hg during pyrolysis process was investigated. The results showed that the volatility of Hg was much higher for coal contained high sulfur content at low temperature, but approximate at high temperature. The volatility increased with increasing temperature for both coals, with different changing trend. In addition, the occurrence mode of Hg for two coals was studied by float-and-sink experiment and X-ray diffraction. The different release behaviors were caused by their mode of occurrence in coal.