

Research of H₂S and COS release during oil shale retorting

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Some sulfur contained in oil shale is released and distributed in shale oil and retort gas during oil shale distillation, which can corrode metal pipe and threaten human health. Research on sulfur release during oil shale retorting may lead to more effective removal of sulfur from oil shale products. Experiments were conducted in a bench-scale reactor to measure sulfur content in retorting gas and semi-coke. Wangqing oil shale and Huadian oil shale were selected as samples in the tests. H₂S were measured in retorting gas at 5 °C/min, 10 °C/min, 15 °C/min and 20 °C/min individually. The sample particle sizes of 0.2 mm - 0.6 mm, 0.6 mm - 1.2 mm, and 1.2 mm - 2.1 mm were arranged in the tests. In addition, COS produced during Huadian oil shale distillation was also analyzed. The results show the peak of sulfur release mainly occurs at 300 - 500°C and 500 - 600°C. The cumulative release of H₂S was reduced at higher heating rates. The highest yielding rate was at 10 °C/min. Large oil shale particle size postpones the sulfur release at 300 - 500°C but has no effect at 500 - 600°C. During 300 - 500°C, 1.2 mm - 2.1 mm oil shale release much lower than 0.2 mm - 0.6 mm and 0.6 mm - 1.2 mm samples while at 500 - 600°C, the three particle sizes of oil shale behave little difference in sulfur yielding. COS release into distillation gas varies similarly to the H₂S during the retorting though the volume of yielding is much lower than the latter.