

# Characteristics of Vanadium and Nicle Distribution and Occurrence Form in the Ash of Petroleum Coke Gasification Slags

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## **Abstract**

Gasification technology can covert high-sulfur petroleum coke to high-value syngas for hydrogen generation and chemical products via synthesis rotes. And it is now widely used for utilization of high-sulfur petroleum coke. High-sulfur petroleum coke gasification slags (POX slags) are byproducts of the gasification process. While heavy metal elements such as vanadium(V) and nickel(Ni) in crude oil are enriched in this process. They are transformed into high-sulfur petroleum coke gasification slags (POX slags). Because of the double properties of environmental toxicity and resource value of V and Ni elements, effective extraction, separation and enrichment methods of V and Ni in POX slags are also urgently needed in order to realize POX slags harmless treatment and resource utilization, which has important environmental, economic and social benefits. In this paper, the study of the characteristics of distribution and occurrence form of V and Ni is carried out. Since the (POX slags have a lot of carbon content which has the property of adsorptivity, the recovery efficiency is affected seriously. Therefore, the oxidation decarburization is first adopted to achieve ash of the POX slags. The ignition point and burnout temperature of POX slags are respectively at 519.6 °C and 635.6 °C. The ash content is 18.7%. With the increase of ashing temperature, the ash particle size is increased. And the distribution of large particles larger than 180 microns gradually increase from 23% to 35%. With the particle size increase, the content of V and Ni in the particles are decreased. While silicon (Si) and aluminum (Al) content are increased. Tessier sequential extraction method was carried out for the test of V and Ni occurrence form in the ash. It shows that residual form content of V and Ni increases from 48.3% to 87.6% and 82.2% to 93.4% especially with the ashing temperature.

## **Keywords**

Gasification Slags, Vanadium, Nicle, Distribution, Occurrence