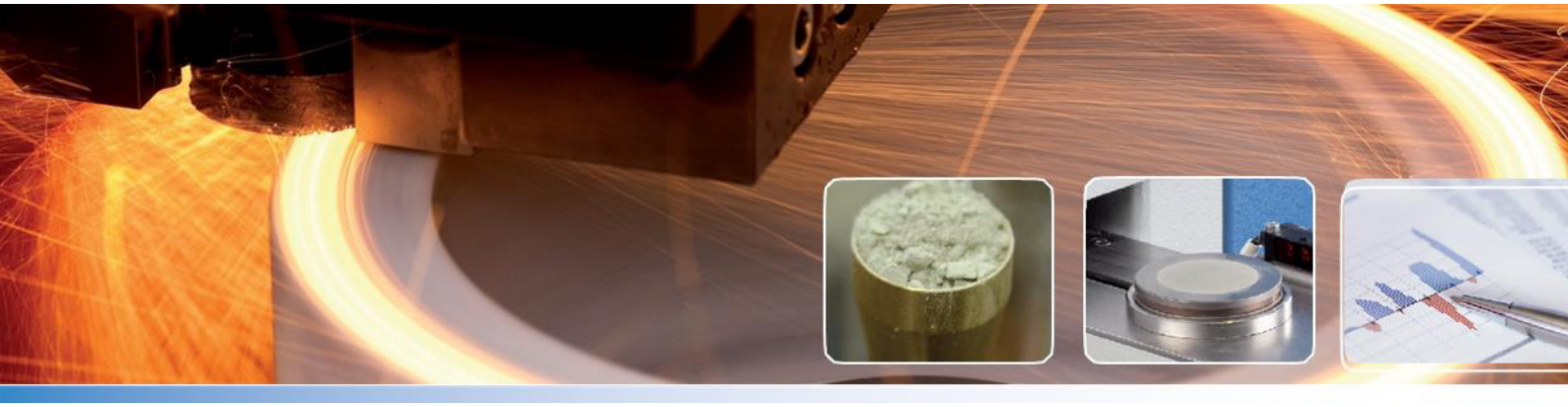

Real-time monitoring of efficient grinding and blending of petroleum coke

Abstract

Calcined petroleum coke is an essential component of carbon anodes. The chemical composition of petroleum coke can be measured by means of X-ray fluorescence spectroscopy (XRF). Pressed coke pellets used for XRF are prone to break apart. It is therefore essential that the sample is well blended with binding aid during grinding in a disc mill. Here, we show that real-time monitoring of the grinding vessel acceleration allows the automatic evaluation of blending efficiency.

Key words

• **Petroleum coke** • **Real time monitoring** • **Grinding** • **Disc mill** • **Blending**

Introduction

Carbon anodes used for, e.g., smelting aluminium consist of calcined petroleum coke, coal tar pitch and anode scrap. The major component is the petroleum coke being used as filler in the production of carbon anodes. Anodes account for a substantial part of the costs in the electrolyzing process. Therefore, quality control of the anode constituents is of great importance for quality and economy of the whole process.

Numerous trace elements including silicon, iron, vanadium, alkali metals and sulfur may accumulate during the production process of petroleum coke and have great influence on the properties of petroleum coke and its derivates. Among these substances vanadium is the most most undesirable impurity as it might cause significant increase in anode consumption rate and decrease in current efficiency. The chemical composition of coke can be determined by using different methods including atomic-absorption, atomic-emission and X-ray fluorescence spectrometry (XRF).

The XRF is a procedure which is simple to carry out and delivers reliable quantitative results of the element content in coke. It requires a thorough sample preparation including sample grinding, blending with binder and pelletizing into steel rings. Here, we show that evaluation of the grinding vessel acceleration is a valuable tool for real-time monitoring of the sample