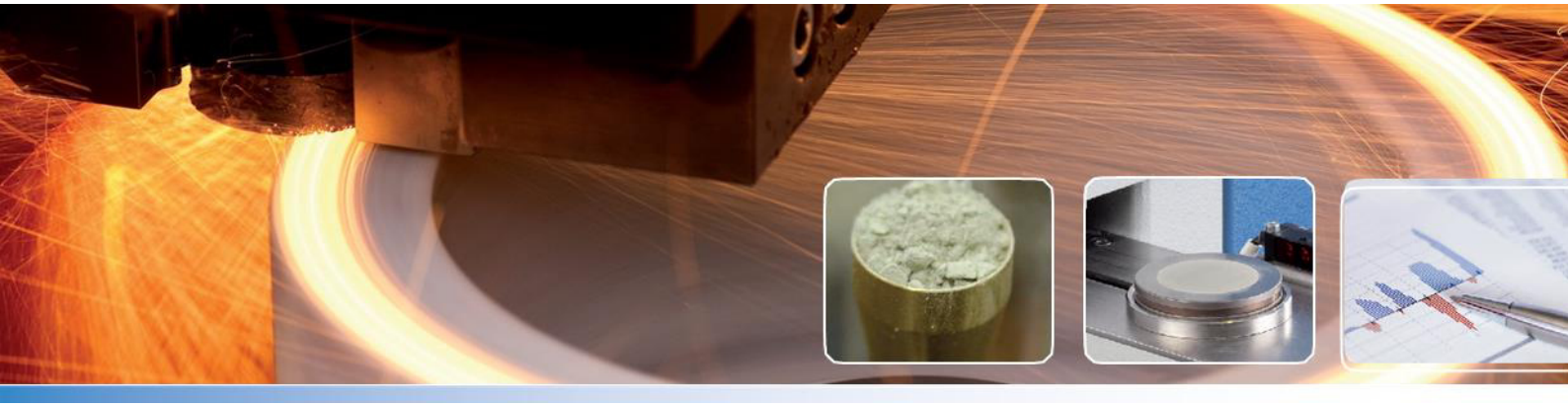

Real-time monitoring of efficiency in quicklime grinding

Abstract

Quicklime is a challenging material to be ground in a laboratory disc mill. Due to blockage of the grinding set, the pulverizing process might become insufficient leading to an incomplete grain size reduction. In this application note, we show that real-time monitoring of the grinding vessel acceleration allows the easy identification of insufficient grinding trials. This smart industry approach is a valuable tool for improving reproducibility of sample preparation and analysis in quicklime applications.

Key words

• **Quicklime** • **Real time monitoring** • **Grinding** • **Disc mill** • **Wet slaking curve**

Introduction

We recently introduced a novel approach to measure the grinding efficiency in a disc mill by evaluation of the grinding vessel acceleration [1]. In this application note, we describe how this technology can be applied for pulverizing of quicklime.

Calcium oxide, also known as quicklime, is a ubiquitous chemical compound used for a wide range of applications like, e.g., desulphurization in basic oxygen steelmaking or production of mortar, plaster and desiccants. One of the main laboratory parameters for the process control of quicklime applications is the reaction rate of the conversion of lime with water (so-called quicklime reactivity as measured by the wet slaking curve). The reaction speed varies considerably depending on the physical properties of the quicklime. It is therefore mandatory that the quicklime used for the wet slake curve determination exhibits a reproducible grain size distribution within a narrow target range.

Typically, disc mills are used to comminute the quicklime to the required grain size. However, grinding of quicklime is complex due to the following two reasons: First, quicklime tends to form agglomerates very quickly. Chemical additives are usually not suitable for prevention of agglomerates as they may adulterate the analysis results. Therefore, the rotation speed of the disc mill has to be set as low as possible. Second, the grinding set (ring and stone)) is blocked easily between the sample material and the inner walls of the grinding vessel causing the interruption of the grinding process. The