

Research Institute:

PTS München
Heßstr. 134
80797 München

Head of the research institute:

Dr. F. Miletzky

Project leaders:

Tilo Gailat
Tel: 089 / 12146-448
Fax: 089 / 12146-36
E-Mail: tilo.gailat@ptspaper.de

Internet: www.ptspaper.de

Research area: Process aims

Process measuring and control technology

Key words:

Filler measurement, measuring instruments

Title:

“Development of a testing method for the quantification of the mineral content of painted and unpainted papers”

Background/Problem area

The mineral content of the painted or unpainted paper plays always a large and important role since during the paper trade, since the kind and the quantity of the contained so-called fillers affect and determine the characteristics of the paper considerably.

So far the mineral content was determined by measuring procedures, which was based partially on the absorption measurement of photons of certain energy. This procedure is used mainly for on-line measurement. It needs however for the indication of the mineral content the mass extinction coefficients of the contained mineral mixture. In order to be able to indicate these, the mineral components and their portion of the total quantity must admit to be.

The problem lies now in the fact that as production of recycling paper and the associated employment of waste paper these relations cannot be indicated in a while ago the no more, since does not admit the mineral components and their proportions in this waste paper is.

Objectives/Research results

Classical filler measuring procedures supply indication of the filler content only under the condition that admits all individual filler components and their concentration (portion of the total filler) is. With employment of waste paper as raw material is however not given. In this case the individual components and concentration must be determined additionally instrumentation. The project is concerned with the development test and/or measuring procedure, which is able to detect the individual components of an unknown filler quantity and to determine their portion of the filler whole. Such a measuring procedure becomes ever more interesting, since the waste paper portion is already large for paper trade and will continue to rise.

The procedure of the x-ray fluorescence measurement uses the characteristic from atoms that when their ionization in internal electron shells re-organization processes run off, in whose consequence photon radiation, characteristic x-ray so called, is emitted. The photons emitted thereby have a discrete energy distribution typical for the respective chemical element. The highly soluble detection of this radiation makes possible thus the identification and the quantitative analysis for the chemical element composition and concomitantly the filler composition. The procedure which can be developed in the project and the sensor system are developed into a complete measuring instrument in form experimental setup/prototype, which is parallel to the production process suitable to the inline measurement of the filler content.

The procedure which can be developed in the project and the sensor system are developed into a complete measuring instrument in form experimental setup/prototype, which could be already tested and presented as complete laboratory instrument. At present the planned test run in a real test environment, e.g. a paper mill, will prepared.

Application/Economic benefits

For many paper manufacturers the filler content of the produced paper is an important quality parameter. The filler content determines and/or affects numerous characteristics of the paper such as firmness, surface finish, printability, drying process etc.

Details or at least a more exact knowledge of the composition of the mineral content of a waste paper pulp suspension are very important for the following reasons for the paper manufacturers, than application. The filler measurement can take place directly, without destruction and parallel to production, within shortest time. Thus the filler content can be affected directly and in time and a continuous and/or a requirement-fair quality of the papers be thus always ensured can. The laboratory fair equipment planned as aim of the project is to fulfil this necessity and makes thereby a substantial contribution for the production and quality control of the paper manufacturers.

Project period: 01.10.2009 – 30.09.2011

Remarks

The research project KF2037903KM9 is being funded by the German Federal Ministry of Economics and Technology BMWi and performed together with Technische Universität Dresden, Institut für nuclear and particle physics, working group physics of radiation; emtec Electronic GmbH and Papierfabrik Freital-Hainsberg GmbH.