

The Development of Cellulose Fiber Based Nonwoven Type Separator

Hiroo Kaji, Henji Hyodo, Makoto Kato, Toshihiro Shigematsu and Noriko Kasai
Tsukuba R&D Laboratory, Mitsubishi Paper Mills Limited

Lithium-ion batteries have been regarded as promising high energy storage devices for many electronic devices. At the same time, more improvement of Lithium-ion batteries is desired in safety and battery performance. We developed the nonwoven separator for lithium-ion batteries made from the mixture of cellulose fiber and PET fiber in order to satisfy the safety and high battery performance.

In the first study, we investigated how the fiber material of nonwoven separator affected on lithium-ion battery performance. There was a good relationship between the porosity of the separator and the battery performance. The nonwoven with a high porosity was a preferable separator for lithium-ion batteries. Cellulose fiber and PET fiber were available for making such a good separator.

In the next study, we found that the nonwoven separator with cellulose fiber had a superior performance to film type separator in heat resistance and the mixture of cellulose fiber and PET fiber made it possible to provide the excellent nonwoven separator with higher wet strength and lower moisture affinity.

Development of Modified Cellulose Nanofiber Reinforced Resin Material

Daisuke Kuroki and Takafumi Sekiguchi
New Business Development Division, Seiko PMC Corporation

It is well known that the so-called shish-kebab structure could be observed when polyethylene (PE) is crystalized under shear flow. This characteristic is applied to the manufacturing process of high strength PE fiber. In this presentation, we discuss the relationship between mechanical properties, the crystal orientation and the injection-molding conditions of the modified cellulose nanofiber (CNF) reinforced PE.

The modified CNF reinforced PE was injection-molded in various conditions, then, its

mechanical properties and crystal orientations were measured. Filling speed and cylinder temperature strongly influenced the mechanical properties and the crystal orientations of the composites.

Development of PVOH for Paper Application

Keisuke Morikawa, Ayumu Yamamoto and Shigeki Takada
Kuraray CO., LTD.

Poly (vinyl alcohol) (PVOH) is widely used as a paper strengthening agent, stabilizer and binder in the paper industry. PVOH also improves air permeability and grease resistance of paper because a good film forming property of PVOH decreases the paper porosity. This report will refer to the properties of the coated paper with an outstanding hydrophobic modified PVOH. The coated paper has better air resistance and higher water resistance compared to conventional PVOHs. Furthermore the reason for the good air resistance was investigated from the perspective of affinity between PVOHs and paper, surface tension of PVOH aqueous solution, and PVOH crystallinities. As a result, the PVOHs having the lower crystallinities provided the higher air resistance. The lower crystallinity should ease the shrinking degree on the drying process of PVOH aqueous solution and lead to a void-less film on the paper.

Impacts and Solutions of Starch on Activated Sludge Treatment

Takuji Yamamoto
Paper Chemical Business Division, Seiko PMC Co., Ltd.

Starch is considered one of the main factors in recent increase of drainage load.

In the stock preparation, the paper-making system, and the effluent treatment process, the metabolic activity of the microbes which utilize starch have great influence on the productivity of paper mills.

Starch is degraded by enzymatic activity of amylase, and metabolically converted to reserve substances or extracellular polysaccharides of activated sludge.

Accumulation of reserve substances bring about aggravation of the treated water quality due to the decrease in substrate removal speed of activated sludge, and superfluous generation of extracellular polysaccharides cause foaming and deteriorated sedimentation property.

In this report, we demonstrated that continuous use of starch in paper-making system, especially raw starch, greatly influence on activated sludge process.

So, we introduce the optimization of the paper making chemicals of a paper-making system

which raises the yield of starch and reduces drainage load, and the microbial preparation “MC series” which improves activated sludge ability.

It should be essential for paper manufacture industry, which aims at saving resources and cost, to take measure against starch load of the effluent treatment.

In this paper, analysis detailed about a paper-forming process is conducted, and the influence which increase of the drainage load by starch has to activated sludge processing, and its measure are introduced focusing on the example of a mill trial of microbial product MC-003.

Papermaking Process Cost Optimization Concepts & Mechanisms with XELOREX™

Christian Jehn-Rendu

BASF South East Asia Pte Ltd.

Minoru Yoshida

Hakuto Co., Ltd.

The paper and board industries have always focused on reducing total costs of operation by improving the paper machine runnability and paper formulation sustainability. Some of the key driving actions in this context involve the optimization of the wet end formulation and improving the production output of today’s paper and board machines. In our paper, we will present an overview of the BASF chemicals and application approaches to achieve these objectives. We will provide case studies on mill scale, to support and validate our concepts and mechanisms.

Plant Optimization with Control Loop Performance Monitoring

—Metso PlantTriage—

Tomoshi Kono

Metso Automation K.K.

In recent years the plant operation with the small number of people is enabled mainly by the advancement of DCS, and the staff is reduced as a part of rationalization and the labor saving. In addition, the succession of the operation know-how of the plant becomes difficult for a similar reason. On the other hand, with complicated advancement of the plant control, the workload on operators and maintenance people are increasing. In such situation, it will be difficult to pay more attention to facilities improvement / the optimization of the plant.

In this paper, I would like to introduce “Metso PlantTriage”, the software which monitors performance of plant controls 24-7-365 and discovers the root cause of process problems with the case example at the bleaching plant where we successfully reduced the chemical consumption.

The word “Triage” used in the product name is the process of determining the priority of patients' treatments based on the severity of their condition in disaster medical care. This rations patient treatment efficiently when resources are insufficient for all to be treated immediately. In “PlantTriage”, we apply technique of the “Triage” to prioritize the problems which were found by 24-7-365 monitoring to optimize the plant in few resources effectively.

Cyber Security for Industrial Control System

Shoichi Doi

Solution Service Business Headquarters, Yokogawa Electric Corporation

In recent years, sophisticated cyber-attacks that target factories and plants have increased even in production control systems. Due to such increases in threats and changes in the environment, the importance of security measures has become even more urgent. In fact, since 2010 damage caused by malware infection has increased significantly.

However, this does not mean that blindly introducing security technology will be sufficient. Unlike information systems in general, a stable, real-time operation on a 365 day/ 24 hour basis is essential considering the sophisticated environment of control systems.

YOKOGAWA group support has taken a holistic approach to security measures in which strategic defense-in-depth concepts are used to effectively evaluate potential risks, consider technical measures and continuously update the system's lifecycle. We believe improvements on a continuous basis are important during operation. Measures are necessary to assess and mitigate the risks identified within the control system and to be better prepared to recover the system in the case of an emergency.

In YOKOGAWA group, by investigating and researching conditions in which security measures are implemented in control systems and the practical use of the latest security technology, we are currently developing effective solutions and optimal measures for a variety of system configurations for different industries and applications. Over the lifecycle of the system, we are committed to providing the best possible solutions and services to ensure high reliability of systems and to provide customer-specific security measures so that stable operation can be maintained.

Maruishi-Bielomatik High Speed Sheeter CFS for 1 Web Cut

Masayuki Sakakibara
Maruishi Co., Ltd.

Maruishi has been signed a license agreement for Folio sheeters with bielomatik in Germany since 1989.

After that, bielomatik bought the section of sheeters from Jagenberg and established the new company bielomatik-Jagenberg GmbH. Maruishi newly signed a license agreement with bielomatik-Jagenberg GmbH in May of 2005, and has already delivered 4 machines in Japan.

In such a situation, on receipt of request for compact design sheeters, bielomatik-Jagenberg released CutMaster CFS105/CFS145 and Maruishi started selling the machine. The compact machine corresponds to minimal space requirements as compared with conventional machine without sacrificing a cutting speed.

As well as Pulp & Paper industry, it is possible to meet the needs of a wide range of customers.

We would like to introduce the advantages of this compact machine “CutMaster CFS105/CFS145” .

Development of Cladding Process of Water-Cooled Boiler Panel and Example of Some Characteristics in Actual Machine

Youichi Shiraishi and Yuuki Shimizu
Welding Alloys Japan Ltd.

In this paper, new maintenance method for cladding of water-cooled boiler panel is explained from viewpoints of safety and cost-effectiveness. This method comes from our basic maintenance philosophy which we call “Smart WeldingTM” for rebuilding. “Smart Welding” is registered trademark for rebuilding and means that every elemental technique concerned should be automated for speediness, safety and reliability.

Surface grinding and thickness measurement were herein automated with cladding process as new technological trial. It can be safely said that this maintenance method will be promising for cladding of worn-out surface of water-cooled boiler panel with some improvements. The cladding surface by this method is also shown in the actual machine (boiler) to be cost-effective in its characteristics, that is to say, corrosion resistance, erosion resistance and lifetime. From

this result, it can be proposed that this maintenance method will be applied to worn-out surface of such boilers as ultra-super-critical pressure boiler, bio-mass boiler, waste-burning boiler, recovery boiler *etc.*

The History of Technological Developments of the Paper Industry in Japan

Part 2: The Dawn of the Japanese Paper Industry

Kiyoaki Iida

In the latter half of the 19th century when the Meiji Restoration began, the paper industry in Europe and America had already put paper machine into practical use, and was developing a new technology of producing pulp from wood. Those technologies conjointly became a model of modern paper industry in the 20th century. When Japanese looked at paper mills in America dynamically manufacturing paper, they made up their minds to do it in Japan. But, things did not go well. After setbacks, they imported paper machines of medium size and manufactured paper with rags cooked in alkali under coaching of highly paid foreigners. The first one began operation in 1872. In a short period of time, Japanese learned know-how, dismissed them and amazingly made a copy of cylinder paper machine by themselves. The high ability of learning new things and a fairly good level of mechanical engineering in those days were a base for successive rapid progress.

Those who were credited at the dawn of the Japanese paper industry were young men who studied in foreign paper mills, such as Masanori Onodera and Ichiro Murata, and Joichiro Majima and Heizaburo Ohokawa who followed the formers. They were responsive to new technologies and introduced them positively to the industry, and their manner of diligence lasted throughout the pre-war period.

The next part will review the growth of the Japanese paper industry.

A Report on TAPPI PaperCon 2015

—April 19-22, 2015 at Atlanta, USA—

Yu Matsunaga

Ishinomaki Mill, Nippon Paper Industries Co., Ltd.

Shisei Goto

NPI Research Laboratory, Nippon Paper Industries Co., Ltd.

PaperCon 2015 was held in Atlanta, USA on April 19-22, 2015 hosted by TAPPI (Technical Association of Pulp and Paper Industry). This time was anniversary event of the foundation of TAPPI, so more than 2,500 people had registered. I report on summary and some topics.

Corporate Profile & Products Information (27)

MATSUBO Corporation

In 1949 our company was born as part of the commercial division of the Matsuzakaya Department Store, with a corporate philosophy of “contributing to society through the development of the Japanese industry sector by introducing excellent machinery, equipment, and new technologies from the West and other countries around the world”.

Our paper & pulp machinery business has been dedicated to supporting Japanese paper & pulp industry by providing advanced technologies from overseas since the foundation of the company. In addition to our import business, we recently launched a business to export Japanese excellent machinery to the overseas paper & pulp industry. We will continuously try to contribute to development of the Japanese and overseas paper & pulp industry by serving as a bridge for technology through the introduction of advanced technology to and from Japan.

—Peer Reviewed—

Analysis of Quartz Content in Paper Using X-ray Diffraction and X-ray Microanalyzer

Toshitatsu Takei, Kazuyuki Tachibana, Toru Yaeda and Fumihiko Shimizu

Material Analysis Center, Oji Holdings Co., Ltd.

A new method of analyzing printing plate wear, which combines X-ray diffraction and X-ray microanalyzer (XMA), was examined. When plate wear happened, the parallel incident X-ray beam method, which is one of the techniques of X-ray diffraction, was used to analyze small particles adhered to the blanket. As a result of the analysis, a small amount of talc ($3\text{MgO} \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$) was detected. However, it seemed that only X-ray diffraction was not enough to presume that talc was a causative material because the talc concomitantly contained small amounts of magnesite (MgCO_3), dolomite ($\text{CaMg}(\text{CO}_3)_2$), quartz (SiO_2) and chlorite ($(\text{Mg}, \text{Al})_6(\text{Si}, \text{Al})_4\text{O}_{10}(\text{OH})_8$). This analytical method was further improved by combining it with elemental mapping observation of Scanning electron microscope (SEM). Using this method, the

small amount of quartz in talc was found to be a factor in plate wear. Furthermore, the relationship between quartz content and plate wear in the experiment results matched previously known plate wear evaluation data. This new analytical method, which is a combination of X-ray diffraction and XMA, is a fast screening method that can detect up to 0.1 wt% quartz in samples.