2014 Annual Meeting of The Institute of Electrostatics Japan
Hiroshima International University
September 7-8, 2014

8pD-1

September 8th (Mon.), <15:00-16:30>
Room 3

Development of low-particle-emission corona discharge ionizer by electrode heating. Part.3 ,

○Tomokatsu SATO*, Masanori SUZUKI*, Akira MIZUNO**

*Technical R&D Center, Techno Ryowa Ltd, **Dept. Environmental and Life Sciences, Toyohashi University of Technology

Abstract:

Corona discharge type ionizers are widely utilized in clean rooms, such as those for LCD manufacturing processes. However, these ionizers are also known to generate particles due to deposition of particles to tip of the electrodes and then these particles are eventually released into air of clean room. In order to resolve this problem, we devised a method for inhibiting the deposition of particles to tip of the electrodes by heating the electrodes to utilize the thermophoretic force to repel fine particles towards low temperature region. In the previous paper, we conducted an experiment on heating an ionizer electrode to approximately 90℃, the amount of deposition of particle on the electrode decreased in comparison with a case of the non-heating. In addition, as a practical heating method of ionizer electrode, we devised a self-heating-type electrode using the Joule heating of the resistor. As a result of this experiment, we found that it was possible to heat the electrode to the desired temperature. In this paper, we report the results of investigation on heating characteristics of self-heating-type electrode.

2014 Annual Meeting of The Institute of Electrostatics Japan
Hiroshima International University
September 7-8, 2014

8pD-2

September 8th (Mon.), <15:00-16:30>
Room 3

Generation process of induction surge from the charged body.

○Kenta WATANABE and Hirofumi SHIMOKAWA

Abstract:

In this study, we used the van-der-Graaf generator type that can easily generate high voltage. A copper wire is being put from the generator at some distance. Other end of the wire is being put near metal plate grounded. The spark discharge was generated between wire and metal plate, when the generator operated. The purpose of this study is to clarify the surge phenomenon that occurs when an object having a high charge potential

2014 Annual Meeting of The Institute of Electrostatics Japan
Hiroshima International University
September 7-8, 2014

8pD-3

September 8th (Mon.), <15:00-16:30>
Room 3

Influence of nitrogen concentration of atmosphere on ignitability of powders

Kwangseok CHOI*, Koujirou NISHIMURA**

*JNIOSH、**TIIS

Abstract:

As useful method to prevent dust explosions, inerting using nitrogen (N2), which is an incombustible gas, has been used in industries. This paper is a report of the relationship between the minimum ignition energy (MIE) of powders due to an electrostatic sparks and the minimum oxygen concentration (MOC) for combustion. In this paper, we have changed the N2 amount in the air in order to control the oxygen concentration. The Hartman vertical-tube apparatus was used in this study. The control range of the dust concentrations of the MIE apparatus used in this study is from 0.5 kg/m3 to 1.8 kg/m3. The maximum spark energy achieved in this study was 1000 mJ. Six sample powders were used in the experiment. As a result, the inerting of N2 has an effect on the ignitability of sample powders as expected. The MIE of all powders used in this study increased due to the increase in the amount of N2 in the air. We finally suggest that 84 % (or above) of N2 for inerting affects the prevention of dust explosions of polymer powders due to electrostatic sparks.

2014 Annual Meeting of The Institute of Electrostatics Japan
Hiroshima International University
September 7-8, 2014

8pD-4

September 8th (Mon.), <15:00-16:30>
Room 3

Development of Electrostatic Ground Monitoring Device

○Tomofumi Mogami, Fumiaki Hashimoto, Tomoju Hirota, Teruo Suzuki, Fumio Yamada, Nobuo Nomura

Kasuga Denki INC

Abstract:

Of the industrial accidents of fires and/or explosions due to electrostatic discharges, spark discharges are most frequent ignition source. To solve and prevent spark discharges, all the groundings of the conductors need to be checked. We have developed an electrostatic ground monitoring device. The electrostatic ground monitoring device mainly has two ground wire connections, pin A which is connected to the ground and pin B which is connected to the LED. The electrostatic ground monitoring device can be detected in less than the resistance value (below 100 kΩ) defined in static safety guidelines. This electrostatic ground monitoring device is expected to be very useful and reliable in preventing problems originating from spark discharges.

2014 Annual Meeting of The Institute of Electrostatics Japan
Hiroshima International University
September 7-8, 2014

8pD-5

September 8th (Mon.), <15:00-16:30>
Room 3

Breakdown Characteristics across Micrometer-scale Surface Gaps under Negative Impulse Voltage

Hiroyuki IWABUCH

Department of Electrical Engineering and Information Systems

Abstract:

With the miniaturization of MEMS devices, the insulation width and the separation between electrodes in such devices have been accordingly reduced. Consequently, electrical breakdown phenomenon across micrometer-scale gap is of great practical interest for insulation designing of miniaturized devices. This paper reports breakdown phenomenon under negative impulse voltage application across micrometer-scale surface gaps fabricated on SO wafers. When applying the negative impulse voltage, the breakdown voltage was constant and independent of gap width and electrode material. The result indicates that the breakdown voltage was strongly affected by the electric intensity on the cathode: the F-N current by the electric field on the cathode can induce the breakdown.