

ภาวะการกักเก็บหมึกผงสำหรับสภาพด้านทานไฟฟ้าของหมึกผงและอิเล็กทรอนิกส์



นางสาววิชนิกุล ศรีโพธิ์

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จุฬาลงกรณ์มหาวิทยาลัย

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต  
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ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

TONER CONFINEMENT CONDITION FOR TONER RESISTIVITY AND ELECTRODE



Miss Witchanikul Sripho

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จุฬาลงกรณ์มหาวิทยาลัย

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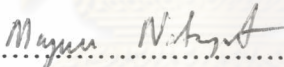
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การควบคุมการเคลื่อนที่ของหมึกผงเป็นปัจจัยสำคัญในการพัฒนาระบบการพิมพ์แบบดิจิทัล โรยหมึกผงชนิดนำไฟฟ้าบนอิเล็กโทรดแผ่นล่าง และให้สนามไฟฟ้าระหว่างอิเล็กโทรดทั้งสองพบว่า หมึกผงเริ่มเคลื่อนที่ขึ้นและลงระหว่างแผ่นอิเล็กโทรดทั้งสองด้วยแรงทางไฟฟ้าสถิต เมื่อเปลี่ยนอิเล็กโทรดแผ่นล่างจากลักษณะแผ่นเรียบเป็นอิเล็กโทรดที่มีลักษณะโค้งเว้า หมึกผงถูกกักเก็บได้ดีในบริเวณโค้งเว้า นั้น งานวิจัยนี้ศึกษาภาวะในการกักเก็บกลุ่มหมอกของหมึกผง โดยอิเล็กโทรดแผ่นล่างที่ใช้มีลักษณะเว้าเป็นรูปกรวย พบว่า ความลึกของบริเวณโค้งเว้าของอิเล็กโทรดแผ่นล่าง สภาพต้านทานไฟฟ้าของหมึกผงชนิดนำไฟฟ้า ปริมาณของหมึกผง และศักย์ไฟฟ้าที่ให้กับขั้วอิเล็กโทรดทั้งสองแผ่น มีอิทธิพลต่อขนาดกลุ่มหมอกของหมึกผงและกระแสไฟฟ้าในขณะที่หมึกผงกระโดด บริเวณโค้งเว้าของอิเล็กโทรดที่ลึกขึ้น ทำให้ขนาดกลุ่มหมอกของหมึกผงมีขนาดเล็กลง และกระแสไฟฟ้าในขณะที่หมึกผงกระโดดมีค่าน้อยลง หมึกผงที่มีสภาพต้านทานไฟฟ้าสูงขึ้น ทำให้ขนาดกลุ่มหมอกของหมึกผงมีขนาดใหญ่ขึ้นและกระแสไฟฟ้าในขณะที่หมึกผงกระโดดมีค่าน้อยลง เมื่อใช้หมึกผงปริมาณมากได้ขนาดกลุ่มหมอกของหมึกผงมีขนาดใหญ่ขึ้นและกระแสไฟฟ้าในขณะที่หมึกผงกระโดดมีค่ามาก เมื่อให้ศักย์ไฟฟ้ากับขั้วอิเล็กโทรดสูงขึ้น ทำให้ขนาดกลุ่มหมอกของหมึกผงมีขนาดเล็กลงและกระแสไฟฟ้าในขณะที่หมึกผงกระโดดมีค่ามากขึ้น งานวิจัยได้คำนวณทิศทางการเคลื่อนที่ของหมึกผงที่กระโดดโดยใช้โปรแกรมเอลฟิน ซึ่งทำให้ทราบทิศทางการและตำแหน่งการเคลื่อนที่ของหมึกผง นอกจากนี้ ยังสามารถหาขนาดกลุ่มหมอกของหมึกผง โดยผลที่ได้สอดคล้องกับผลการทดลอง

ภาควิชา วิทยาศาสตร์ทางภาพถ่ายและเทคโนโลยีทางการพิมพ์ ลายมือชื่อนิสิต..... วิชานุกูล ศรีโพธิ์.....

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ลายมือชื่ออาจารย์ที่ปรึกษาร่วม..... *星野 坦之*.....



###4472407123: MAJOR IMAGING TECHNOLOGY

KEY WORD: THE SHAPE OF DENTED ELECTRODE/ THE TONER CHARACTERISTIC RESISTIVITY/ THE TONER CONFINEMENT

WITCHANIKUL SRIPHO: TONER CONFINEMENT CONDITION FOR TONER RESISTIVITY AND ELECTRODE. THESIS ADVISOR: PROFESSOR SUDA KIATKAMJORNWONG, Ph.D., CO-ADVISOR: PROFESSOR YASUSHI HOSHINO, Ph. D., 204 pp. ISBN 974-17-2505-1.

Control of toner movement is an important parameter in the development of digital printing. The conductive toner particles were sprayed onto the lower electrode. An electric field was applied between the two electrodes. The toner moved up and down between the two electrodes by electrostatic force. When the cone shape of the dented electrode replaced the lower plate, conductive toner particles were confined in the dented electrode. This research studied the toner confinement conditions required to form a toner cloud state using the cone shaped dented electrode. We found that the depth of cone-shaped, dented lower electrode, the resistivity of conductive toner and applied voltage between the electrodes are the influencing factors that determine the optimum size of toner cloud confinement and the toner jumping current. The deeper cone shaped, dented electrode reduces the size of the toner cloud confinement and the required toner jumping current. A high resistivity toner produces a larger size toner cloud and decreases the toner jumping current. When a greater amount of toner is placed into the electrode, a larger size toner cloud and greater toner jumping current are obtained. A higher applied voltage reduces the size of the toner cloud and increases the toner jumping current. This research calculated the toner movement direction during jumping using an Elfin program, which allowed us to observe the direction and position of toner cloud movement in addition to the size of the toner cloud. The calculated outcome agrees well with the experimental results.

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