CHAPTER 5

CONCLUSION AND SUGGESTION

From the previous results and discussion, it can be concluded that various factors affect the charging properties, in term of q/m, are as follows: a carrier dependency, a CCA dependency, a charging mechanism, a toner shape, an environment, and a measurement technique. First, the carrier size controls a number of toner particles per carrier particle. The small size carrier has a smaller number of toner particles per carrier particle than does large size carrier, leading to higher q/m values. Second, the presence of CCA helps increase more effectively charging sites on the toner; it increases the q/m values and reduces the charging time needed to reach a saturation. The affinity for electron exchange of CCA types controls a magnitude and a charging rate of the toner. Moreover, the proper increase in CCA amounts increase the q/m values. Third, the various charging mechanisms give the individual q/m values which cannot be used as a generally representative value. Fourth, the toner shape also influences the q/m values; the q/m values of the spherical-shaped toner are higher than that of the irregularly-shaped toner. Interestingly, the environment affects the q/m values, however, it depends also on the component of toner. The additions of CCA and silica into the toner influence the toner charge when the humidity is varied. Finally, the measurement technique gives the difference q/m values that vary from one technique to another technique.

On the other hand, the charging properties influence the quality of the printed images. The toners without CCA gives the high background density. The toner with CCA type A from 0.5 wt% to 3 wt% does not give background density, whereas the toner with CCA type B gives background density regardless of any weight. When increasing CCA amounts, the solid densities are increased to bring up the high dot gain percentages. The spherical-shaped toner gives ghost images leading to the background density and increasing dot gain. However, it cannot indicate that which proper q/m values are suited for producing a good image quality, because it does not depend on only the measurement technique but also the toner components.

Suggestion

This thesis does not touch on other properties of the spherical toner, for example, the Tg of the polymer binder which deals with the fusing properties. Moreover, the silica types and their amounts, which relate to the humidity effect, are not intensively investigated. Furthermore, the charging mechanism is not elucidated clearly, because many factors have not been concentratedly studied, for example, a rotation speed, a shaking time and controllable force, and a donor material, etc. Almost all factors mentioned above are interestingly recommended for future work.