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Abstract
The research is to prepare the CNT field emission cathode by electrophoretic deposition. The study is divided into three major parts mainly. The first part is the preparation of the electrophoretic liquid and the analysis of electrophoretic nature. By adding two kinds of cationic surfactant Polyethyleneimine (PEI) and Disperbyk-184 to increase the superficial electric potential among particle. Using ethanol and isopropyl alcohol to regard as bearing solution, and also adds the nitric acid magnesium to increase its electric conduction. Using Zeta-potential, particle size analyzer, viscosity meter to count and measure the nature of the solution in the experiment. The second part is observation of the voltage of electrophoresis, relation between current and time of the electrophoresis. The experiment uses the electrochemical workstation to do those potentiostatic experiment and potential square experiment.The third part is, observing for the result of the field emission experiment and its characteristic to add silver powder and dioxide silicon powder. Judging by J-E and F-N curve observation, dense degree of facula, and field emission’s stability that the result after adds silver and dioxide silicon.
The results show that simultaneously increases two kinds of cationic dispersing agent in the particle size analysis, and on the Zeta potential both would be well down. Counts the survey from the viscosity meter to demonstrate that, the effect of electrophoresis is the best when the ratio of PEI and carbon natotube addition is 1.5:1. Observing from the Scanning Electron Microscopy, the morphology of the deposited layer is smooth.
The analysis by the change of current and time of the electrophoresis, current will tend towards one slope and decrease progressively through certain time. According with Faraday's law, the relation is in direct proportion to time and deposited weight. It could verify from the graph of deposited weight and time. Using potential square experiment is effective to deposit a smooth layer.Observing by J-E and F-N plot, the best result of adding silver and dioxide silicon at the same time. The electric field Eto is 1.25 V/um, and the marginal value is 2.5 V/um, will be a careful stability of facula in this experiment.
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