論文 / 著書情報
Article / Book Information

題目(和文)	固体前駆体を導入した噴流層とグライディングアーク放電のコンビネーションを用いた粒子コーティングプロセスの開発
Title(English)	Development of Particle Coating Process Using a Combination of Gliding Arc Discharge and Spouted Bed with Solid Precursor
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種別(和文)	要約
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（博士課程）
Doctoral Program

論 文 要 約

THESIS OUTLINE

専攻： Department of	Chemical Engineering 専攻	申請学位（専攻分野）： Academic Degree Requested	博士 Doctor of (Engineering)
学生氏名： Student's Name	Warit Ua-amnueychai	指導教員（主）： Academic Advisor(main)	Hidetoshi Sekiguchi
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要約
Thesis Outline

In this research work, we aim to develop and investigate a novel particle coating process using a combination of gliding arc discharge and spouted bed condition with solid precursor. The coating morphology, behaviors, and mechanisms were investigated using a zinc solid precursor and PMMA particle model system. This work considered the effect of several process parameters related to the gliding arc discharge and spouted bed on coating behaviors, including coating amount, surface coverage, coating thickness, and bulk electrical conductivity. The process parameters that were studied in this work are coating duration, applied voltage, PMMA particle size, zinc/PMMA mass ratio in the bed, electrode angle, and type of plasma gas. The spouting condition and gliding arc discharge were also investigated. In addition, the feasibility of the novel coating process on different types of solid precursor and coating target were studied.

Chapter 1 Introduction, describes and explains coating process, plasma technology, and hybrid system between plasma and spouted bed. The research objectives and approaches were also presented in this chapter.

Chapter 2 Experimental and General Coating Behavior, describes the experimental procedure. In addition, the coating morphology and coating behaviors, consisting of coating amount, percentage coverage, thickness, and bulk electrical conductivity as a function of coating duration were discussed. The feasibility of this novel particle coating process using zinc solid precursor and PMMA particle as a coating target was also confirmed. Coating structures were observed on the PMMA surface. From the coating process, electrical conductivity was imparted to the non-conductive PMMA particles.

Chapter 3 Effect of Process Parameters Related to Gliding Arc Discharge and Spouted Bed, studies the effect of applied voltage, PMMA particle size, zinc/PMMA mass ratio in the bed, electrode angle, and type of plasma gas on coating behaviors for a model system of zinc solid precursor and PMMA particle.

Chapter 4 Variation in Particle Types, studies the feasibility of this particle coating process with different solid precursor and substrate. Two systems were chosen for this study; 1) copper solid precursor and PMMA particle system and 2) zinc solid precursor and silicon dioxide system.

Chapter 5 Coating Mechanisms, describes the coating mechanisms of the novel particle coating process based on zinc solid precursor and PMMA particle system. The controlling of the coating mechanism was also discussed by adjusting several coating conditions.

Chapter 6 Conclusion, summarizes the findings obtained from this study and provide recommendations for future prospects. The proposed novel particle coating process using a combination of gliding arc discharge and spouted bed with solid precursor shows a promising future for the particle coating application.