

論文 / 著書情報
Article / Book Information

題目(和文)	生体材料開発に向けた蛋白質結晶エンジニアリング
Title(English)	Engineering of protein crystals for development of artificial biomaterials
著者(和文)	ティエンカングエン
Author(English)	tien Khanh Nguyen
出典(和文)	学位:博士(工学), 学位授与機関:東京工業大学, 報告番号:甲第11623号, 授与年月日:2020年9月25日, 学位の種別:課程博士, 審査員:上野 隆史,丸山 厚,金原 数,小畠 英理,松田 知子
Citation(English)	Degree:Doctor (Engineering), Conferring organization: Tokyo Institute of Technology, Report number:甲第11623号, Conferred date:2020/9/25, Degree Type:Course doctor, Examiner:,,,,,
学位種別(和文)	博士論文
Category(English)	Doctoral Thesis
種別(和文)	要約
Type(English)	Outline

Engineering of protein crystals for development of artificial biomaterials

Nguyen Khanh Tien

2020

Preface

This doctoral thesis was implemented at Department of Life Science and Technology, School of Bioscience and Biotechnology, Tokyo Institute of Technology during the Integrated International Program (IPG A) from October 2015 – July 2020 under the supervision of Prof. Takafumi Ueno. The author would like to express the appreciation to Prof. Takafumi Ueno for his supervision, guidance, supports such a wonderful research environment with the working facilities. The author is also deeply grateful to Assistant Prof. Satoshi Abe and Basudev Maity for his training and suggestion during this course.

The author wishes to express high appreciation to Technician Ikeda-san and Suzuki-san for her collaborations in training and instructing of preparation experimental materials in Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM). The author also thanks to Sping-8 staff and facilities for providing opportunities for measurement of X-Ray crystallographic data. The author is also grateful to Bio-center (Suzukakedai campus) and Suzukakedai Technical Center for further analysis and measurements.

The author would like to give great gratitude to Dr. Hashiru Negishi for his support, significant discussions, cooperation of several experiments at the master course, and Ms. Takeya Sho for his initial guidance as a tutor. The author is thankful to Ms Tanaka-san for her secretarial supports and other laboratory members for their providing and encouragement.

Finally, the author expresses the deepest thanks to family members for their close supports and encouragement in Japan's live.

Nguyen Khanh Tien

Department of Life Science and Technology
School of Life Science and Technology
Tokyo Institute of Technology
July - 2020

OUTLINE

Chapter 1. General Introduction	1
Chapter 2. Construction of supramolecular nanotubes from protein crystals	31
Chapter 3. <i>In-cell</i> immobilization of cascade enzymes into polyhedral protein crystals for construction of solid-biocatalysts	57
Chapter 4. Engineering of polyhedral protein crystals within <i>E. coli</i> for construction of multi-layered solid materials	93
Chapter 5. General Conclusion	115
List of Publications, Patent, Awards, and Conferences	