SIP 戦略的イノベーション創造プログラム
Cross-ministerial Strategic Innovation Promotion Program

NEDO

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Innovative Design / Manufacturing Technologies

Comfortable Society with Ceramics!

About this Project

■Ceramics are key materials for advanced basic industries, and ceramic industry is Japan's strength. Because of rapid growth of industries in neighbor countries, however, technological innovation creating new value in ceramic products is critically needed to maintain and consolidate our technological superiority and international competitiveness in global markets.

■The project is developing the two key technologies: "Additive Manufacturing" for realizing complex-shaped ceramic products and reducing their lead-times, and "Hybrid Coating" on 3D bodies for enhancing their functionality and durability

■Based on these technologies, we aim at establishing manufacturing technologies for a wide variety of "high value-added ceramic products" in various fields.

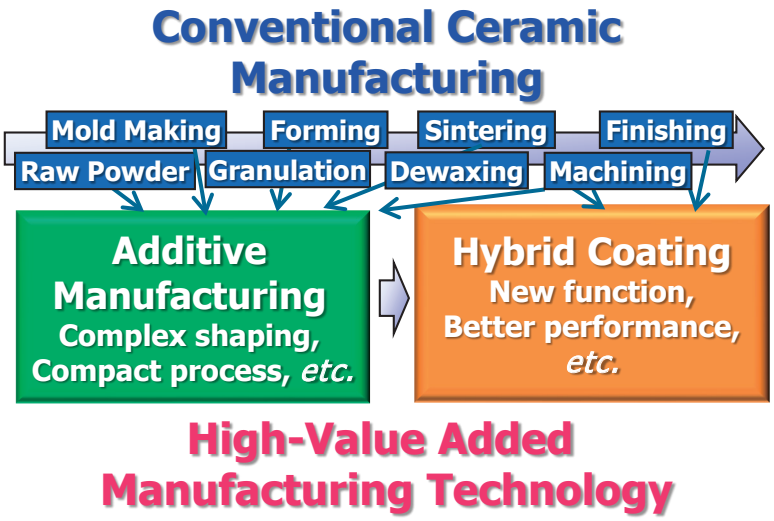
Research Targets

■Additive Manufacturing

- Any complex shaping possible
- "Mold free", shortening production- and lead-time
- Developing also "Direct laser sintering"

■Hybrid Coating

- Ceramic coating on 3D shaped body
- Converting polymer/metal surface to ceramics.
- Surface modification / New function

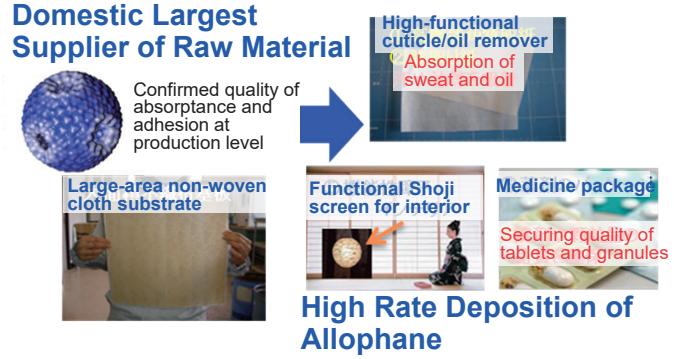


Test Uses / Application Examples

■Additive manufacturing: Recruiting new applicants for trial use of the developed technologies.

■Hybrid Coating: Establishing and activating "Coating Hub". Recruiting new applicants for trial use of the developed technologies.

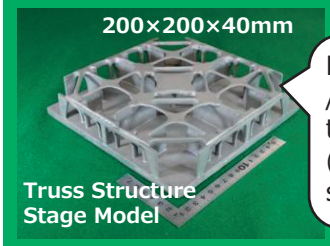
■"Coating Hub" Application Example 1: Coating on artificial tooth



■"Coating Hub" Application Example 2: Moisture control components

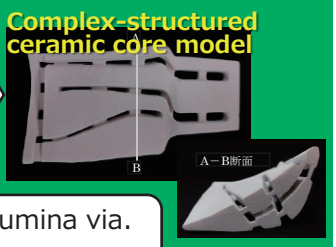
Research Achievements

Additive Manufacturing

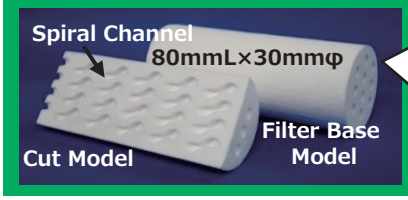


Light weight /high stiffness truss structure (Hitherto wall structure)

Complex shape never attainable hitherto

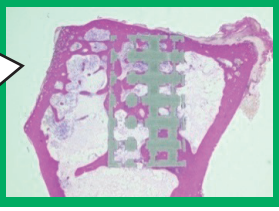


Transparent alumina via. 1 min laser irradiation



Complex channels like spiral ones (Hitherto straight ones)

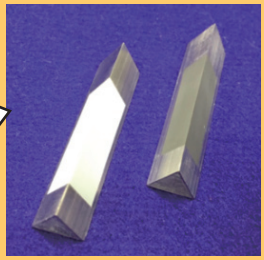
Bone prosthesis model with bone forming ability (equal to or better than conventional products) and intricate shaping



Hybrid Coating

Coating to flying pan: Applicable to curved surface and large components

White or black coating onto a prism: Dense coating even to a sharp edge



Future Outlook

■Participating companies implement development and commercialization of the target products in each business field.

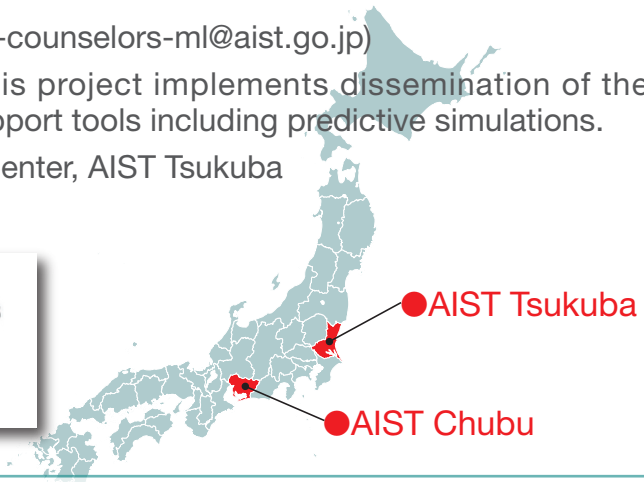
■Additive Manufacturing: AIST Chubu and JFCC implement dissemination of the developed technologies on powder layer manufacturing and direct laser sintering, respectively, via. trial use, *etc*.

Contact: Technical Counselors, AIST Chubu (chubu-counselors-ml@aist.go.jp)

■Hybrid Coating: “Coating Hub” established in this project implements dissemination of the developed technologies via. trial use, *etc*., using support tools including predictive simulations.

Contact: Advanced Coating Technology Research Center, AIST Tsukuba (act-webmaster-ml@aist.go.jp)

High-Value Added Ceramic Products Manufacturing Technologies



Research Theme：	High-Value Added Ceramic Products Manufacturing Technologies
Members：	National Institute of Advanced Industrial Science and Technology (AIST), Japan Fine Ceramics Center (JFCC), OSAKA UNIVERSITY, NORITAKE CO., LIMITED, TOTO LTD., NGK INSULATORS, LTD., NGK SPARK PLUG CO., LTD., Kyushu University, Tohoku University
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