●Development Stage

(Fiscal Year 2008–2010)

# Western Tono Area

Development of a New Industry Involving Environmentally Friendly Ceramics

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Life Sciences
IT
Environment
Nanotech Materials
Others

## Framework for Project Promotion

Project Director……Tetsuya Kameyama
Chief Scientist……Masakuni Ozawa
Science and Technology Coordinator…Tadashi Sekiya
Project Manager…… Hiroshi Asai

## Core Research Organizations

Nagoya Institute of Technology
Gifu Prefectural Ceramics Research Institute

## Major Participating Research Organizations

Industry…Icot Ryowa Co., Ltd., Ibiden Co., Ltd., Umakake Co., Ltd., ODA POTTERY Co., Ltd., Kakuzin Chemical Co., Ltd., Katamiya Co., Ltd., Kaneki Co., Ltd., Kanemizu Mizuno Color Works Co., Ltd., Kawai Lime Co., Ltd., Kusaba Chemical Co., Ltd., Japan Ceramics Co., Ltd., Josai Chemical Co., Ltd., Shinko Yogyo Co., Ltd., Shinmei Refrax Co., Ltd., Cera Messe Co., Ltd,, Daido Co., Ltd., Takasago Industry Co., Ltd., Chubu Electric Power Co., Inc., TYK Corporation, Tosan Kougyousyo Co., Ltd., Fuji Chemical Co., Ltd., Maruko Ceramics Co., Ltd., Yamaai Seitousyo Co., Ltd., Yamaka Clay Material Corporation, Yamase Co., Ltd., Yamatsu Seito Co., Ltd., Yamawa Togyo Co., Ltd.
Academia…Nagoya Institute of Technology, Nagoya University, Aichi Institute of Technology Gifu University
Government…Gifu Prefectural Ceramics Research Institute, Tajimi City Pottery Design and Technical Center, Toki Municipal Institute of Ceramics, Mizunami City Ceramics Industrial Technical Laboratory, AIST, JFCC

## Aims of Project

The western Tono area, including the cities of Tajimi, Toki, and Mizunami, possesses excellent mass-production technology for pottery/porcelain and related products, making this area one of the largest pottery/porcelain production centers in Japan. However, sales have fallen dramatically in recent years because of a prolonged recession. In this area, therefore, it is a priority to advance local industries and encourage sustainable economical development. The universities and research institutions in this area have achieved outstanding results in terms of manufacturing techniques for porous ceramics and functional inorganic particles, as well as in the technology required to reduce the environmental load based on catalysts and recycling. This project aims to create a new industry involving environmentally friendly pottery/fine ceramics by fusing the technological seeds of universities and research institutions with the technical capabilities of industries in the area. Using these technologies, we will seek to develop the following materials: 1) materials to counter the heat-island effect, 2) particles effective in shielding from infra-red radiation, 3) ceramics effective in environmental cleanup, and 4) environmentally friendly pottery, etc. Furthermore, the obtained materials will be examined in terms of their potential for commercialization.

## Contents of Project

1. Development of new-type ceramics using a gel-casting method

New-type porous ceramics obtained using a gel-casting method are intended for application as architectural materials that mitigate the heat-island effect. The study will also investigate the commercialization of electronic components produced using gel parts within compact ceramics.

2. Development of light-responsive inorganic nanoparticles

In this study, the following materials will be developed using technologies for the synthesis of inorganic materials (e.g., hydrothermal methods and/or sol-gel methods) and preparation techniques adopted to obtain pigments and glazes: 1) ultraviolet-shielding materials, 2) heat-shielding/insulating materials that are infrared-reflective, and 3) safe/harmless inorganic pigments. The developed materials will be considered for practical use in, for example, pottery, paint, cosmetics, and plastics.

3. Development of next-generation ceramics for environmental cleanup

This study seeks to develop 1) an exhaust-emission control system consisting of a ceramic catalyst-supported honeycomb structure, 2) a highly efficient technique for retrieving raw materials from exhaust-gas filters in diesel vehicles via mechano-chemical treatment under hydrothermal conditions, and 3) a high-speed drying technique with a low environmental load by applying a high-temperature superheated steam heater. Finally, we will aim to commercialize these technologies.

4. Development of environmentally friendly pottery

The aim of this study is to develop lightweight, reinforced platewares in which fine bubbles are homogeneously dispersed. Furthermore, manufacturing techniques will be investigated for both porous ceramic molds and alumina-containing porous resin molds in order to obtain alternatives to plaster molds.

### Concept of Western Tono Area Project <Development Stage>

**Basic Stage Project (2005-2007)**
Development of Next-generation Manufacturing Technology for Ceramic Ware

Theme Ⅰ: Establishment of porous ceramics production technology

Theme Ⅱ: Establishment of technologies for manufacture and application of inorganic nanoparticles

*Eco-cera Project* (*Support for Business*)
- Promotion of Business
- Support of Design
- Introduction of Bank Finance
- Dissemination of Research Results (Presentation at Symposium)
- Human Resources Development (Ceramics Product School, etc.)

Participating Research Organizations
Nagoya Institute of Technology
Gifu Prefectural Ceramics Research Institute
Tajimi City Pottery Design and Technical Center
Toki Municipal Institute of Ceramics
Mizunami City Ceramics Industrial Technical Laboratory
Nagoya University, Aichi Institute of Technology
Gifu University, AIST, JFCC

Participating Industries : 27

*Promotion of commercialization and technology transfer*

*Expansion and reinforcement of industry-academia-government collaboration*

**Development Stage Project (2008-2010)**
**Development of New Industry for Environmentally Conscious Ceramics**

*Theme Ⅰ* Development of new ceramics by gel-casting method
- ①Products contributing to reduce greenhouse warming effect
  - Low temperature sintering (Low-temperature sintered?) ceramics
  - Ceramics that ease heat island phenomenon
  - Electronics parts (for automobiles)

*Theme Ⅱ* Development of light-corresponding nanoparticles
- ②Products contributing torecycling society
  - Recycle of tableware
  - Recycle technology for diesel particulate filter ceramics

*Theme Ⅲ* Development of next-generation environmental cleanup ceramics

*Theme Ⅳ* Development of environmentally conscious ceramics
- ③Products contributing to safe, secure and high-quality society
  - Pigments and glazes free from harmful materials
  - Ceramics for harmful gas purification

*Promotion of commercialization by applying these programs*

Assistance program of commercialization in Gifu Prefecture,
Assistance program of practical application in other ministries Industrial cluster project
Cultivation of market (presentation at exhibitions, sales to users)

***Creation of New Industry for Environmentally Conscious Potteries and Ceramics***