

Development of new metallurgy-based materials and exploration of their functionality

Project Leader

FUJITA, Takeshi, Dr. Eng.

Professor, School of Engineering Science

1. Objective

This project is aimed at:

In this SSP project, we develop new metallurgy based materials such as ultra-high-entropy alloys, and explore their unique functionality.

High-entropy alloys are established as a novel metallic material. High-entropy alloys, alloys that mix five or more elements in equal amounts, have properties superior to those of conventional alloys; they are attracting attention as next-generation materials. To date, research on high-entropy alloys has been limited to five constituent elements. High-entropy alloys composed of ten or more elements may have potential as versatile catalysts that can change their own microstructure depending on the reaction field to which they are subjected.

2. Project Outline

To achieve the above aims, the project will consist of the following phases:

- (a) design of new material systems;
- (b) development of new fabrication/synthesis techniques and exploration in catalysis; and
- (c) characterization of microstructures by means of advanced transmission microscopy.

3. Expected Performance

In this project, the successful candidate would be expected to:

- (a) work independently;
- (b) assist the senior members with the development of new materials; and
- (c) provide supervision/instruction for students.

4. Required Skills and Knowledge

The successful candidate for this project will have the following knowledge and skills:

- (a) strong English reading skill and writing skill sufficient for publication in well-recognized academic journals;
- (b) basic knowledge of metallurgy, electrochemistry and microscopy; and
- (c) high motivation toward research.

References

- (1) Takeshi FUJITA: "High-Entropy Alloy Catalysts toward Multi-Functionality: Synthesis, Application, and Material Discovery." Mater. Trans., in press. DOI: [10.2320/matertrans.MT-MH2022003](https://doi.org/10.2320/matertrans.MT-MH2022003)
- (2) Takeshi FUJITA: "Hierarchical nanoporous metals as a path toward the ultimate three-dimensional functionality." Sci. Tech. Adv. Mater., 18 (2017) 724–740. DOI: [10.1080/14686996.2017.1377047](https://doi.org/10.1080/14686996.2017.1377047)

Leader's webpage:

(URL)

<https://www.kochi-tech.ac.jp/profile/en/fujita-takeshi.html>

KUT's SSP admission guidelines:

https://www.kochi-tech.ac.jp/english/admission/ssp_aft19oct/ssp_application_guideline.html

Contact

E-mail: fujita.takeshi@kochi-tech.ac.jp