

平成 28 年 4 月 10 日

国立研究開発法人理化学研究所  
理事 松本洋一郎

## 平成27年度実施主任研究員の間接レビューの結果について

主任研究員制度設置規程(平成 25 年規程第 13 号)第 5 条に基づき主任研究員の研究レビュー(中間)を踏まえ、レビューアーから送られた評価結果は以下のとおりです。

### 1. 評価対象：大森素形材工学研究室 大森 整主任研究員

#### 1) 評価体制

実施日：平成 26 年 3 月 11 日(金曜日)

4 名の所外有識者を評価委員とするヒアリングレビューを実施(内一名は急きょメールレビューにて評価を実施)。

評価者：

Masanobu AWANO, Director  
Inorganic Functional Materials Research Institute, National Institute of Advanced Industrial Science and Technology (AIST)

Fritz Klocke, Professor Doctor  
WZL RWTH Aachen University/Fraunhofer Institute for Produktion Technology IPT

Tsunemoto KURIYAGAWA, Professor  
Graduate School of Medical Engineering, Tohoku University

Yoshimi TAKEUCHI, Dean, Professor  
Graduate School of Engineering, Chubu University

#### 2) 評価結果の概要等

*General comments:*

##### 【Reviewer 1】

Prof. Ohmori has comprehensively reported on his research activities. In his presentation, a substantial overview on current research activities and on main results was given. In addition to the well-known activities in ELID Grinding new challenging fields of research were addressed. In particular to be mentioned are: ultra-/ nano-precision mechanical fabrication for functional devices, the application on micro-fabrication processes and the research on tribo-fabrication and hybrid processes. All of these research areas are highly relevant for science in engineering and the research results do bear big potential to be applied on the market place.

It is evident that research results achieved and presented might lead to significant improvements and impacts in science and industry. The list of publications provided is

convincing in every respect. In addition to ELID-grinding and ultra-precision machining Dr. Ohmori reported on the new "ion-shot dressing" approach. Through this technology the ELID-grinding process can be significantly enhanced. Other important research results achieved by Dr. Ohmori's group are their findings on the machining of ceramics using PCD (poly-crystalline diamond) microtools. Ohmori clearly showed the potential of these types of micro-tools.

These are only particular examples of latest research results presented by Dr. Ohmori. In general, it can be concluded that the research work of Dr. Ohmori and his group is at the leading cutting-edge in manufacturing science. The research objectives and results presented and published are highly valuable and very relevant for both: the industry and the scientific community.

The management of the research laboratory does follow high international standards. The scientific and technical staff is highly motivated. In my perception researchers do work in an open atmosphere, which leaves room for creativity and own initiatives. There is open space and enough room for researchers to bring in own research ideas. Furthermore, young scientific staff members have sufficient room to build up their own scientific career path ways.

In general I might conclude that Dr. OHMORI and his team carries out cutting-edge research in manufacturing science. In my assessment the research is excellent in terms of scientific impact, relevance for industrial applications and the research topics under work do complete and complement RIKEN's research portfolio in an activities in an excellent manner.

#### **【Reviewer 2】**

##### **Research objectives:**

The manufacturing/fabrication technology is essential to provide the specific devices and special instruments in scientific experiments of RIKEN. Ohmori laboratory can support the task from the viewpoint of ultra/precision manufacturing technology, especially by use of ELID (Electrolytic In-process Dressing) technology, which was devised by him. The technology enables the effective and fine grinding of very hard materials. Using ELID technology as tool, he has conducted a variety of research works such as ELID grinding, ELID super smooth finishing and ELID ultraprecision grinding. In addition, his research fields are expanded up to ultra/nanoprecision mechanical fabrication of functional devices, micro-fabrication, tribofabrication and hybrid fabrication process. These technologies have academic significance, as widely recognized.

##### **Research results:**

A large number of research results are published inside Japan and out, as seen from his publication list. Dr. Ohmori is a fellow member of CIRP, which is the most well-known academy in the manufacturing filed. Through CIRP, the effectiveness of ELID technology is recognized in the world, and ELID technology is used not only in Japan but also in the world, which is highly evaluated.

##### **Management of the Laboratory:**

The management of the Laboratory seems to me very well. The facilities and equipment are fully provided in Ohmori Laboratory to pursue the fabrication activities with regard to ELID and ultra-nanoprecision manufacturing. However, I feel that the number of senior researchers is a little bit few, compared with that of machines, although the

member composition of researchers including university students and company staff are reasonable.

**Future research plans:**

Several research projects are on-going in conjunction with related fields, that is, with JSPS, EUSO, RIC, etc. It seems good.

**Overall assessment:**

In terms of research objectives, research results, laboratory management and future research plan, I am sure that Ohmori Laboratory can be highly assessed.

**Other opinions:**

RIKEN's review systems are good enough to evaluate Chief Scientist.

【Reviewer 3】

**Research objectives:**

The activities of Dr. Hitoshi Ohmori's Materials Fabrication Laboratory (MFL) are well matching with the industrial demands on ultra-precision mechanical manufacturing in various applications widely.

**Research results:**

“ELID (Electrolytic In-Process Dressing) Grinding” revealed on its principle is in further progresses and in application stage, too. Nano-scale artificial surface treatment and meter-scale fabrication for the high end and the high added value products have been proceeded simultaneously.

**Management of the Laboratory:**

MFL has made significant contributions in the research activities and various industrial application fields for the precisely controlled nano-scale surface treatment technology. Well managed laboratory system on funding, human resources and research spaces have been established sufficiently.

**Future research plans:**

Further expectation for the research extension in the industrial field is the mobility system, for example. Tribology of the vehicles is an infinite research target as problems to be solved for the ultimate approach of saving energy. The ultra-precision mechanical and electrochemical machining process technology will be realized and established by their collaboration.

**Overall assessment:**

Dr. Ohmori has developed revolutionary material processing technologies for ultraprecision, ultrafine and ultra-smooth grinding, lapping, polishing, cutting and forming. ELID and its extension results are in the great success for various industrial applications of optical, electronic, bio-materials and others. The evolutionary and fruitful research results in the novel micromechanical fabrication extremely impressed the reviewer.

Dr. Ohmori and colleagues published and issued many distinguished articles and patents in world-recognized level of their challenges.

【Reviewer 4】

Dr. Hitoshi Ohmori is an internationally famous researcher in the area of ultra-precision mechanical manufacturing, especially of ELID grinding. His research outcomes have made significant impact to a wide range of industry.

The main objective of his research is expanding to the development of the new ELID applications to meet practical and applied industrial needs widely. The goals of Dr. Ohmori's research programs are very clear, suitable and useful.

Furthermore, he has proposed the new technologies of monozukuri, such as a tribofabrication and hybrid processes. And also, a new concept of "Monozukuri based on Pico-Technology", i.e. "Pico-machining", which he proposed as a post-nano-technology, is very impressive and innovative. We hope that he will promote a pico-technology in the near future.

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