

Regarding the Results of the Investigation into a Case of Research Misconduct

September 29,

Reiwa 8 National Institute for
Materials Science**1. Background and Summary of Investigation Findings**

On January 22, Reiwa 7, the research misconduct reporting hotline established by NIMS received a report stating that allegations of research misconduct regarding multiple co-authored papers by two former employees had been raised on PubPeer (hereinafter referred to as “PubPeer”). Based on the results of a preliminary investigation, it was decided to conduct a full investigation, and an Investigation Committee was established. As a result of this investigation, it was determined that specific acts of misconduct (fabrication and falsification) had occurred in seven papers, and that self-plagiarism had occurred in six of those papers.

2. Investigation2-1. Investigation
Structure

Chair: Eiji Nakajima	Director, National Institute of Technology (until March 31, Reiwa 8) President of the National Institute of Technology (from April 1, Reiwa 8) (External Expert)
Committee Members Izumi Muto	Professor, Graduate School of Engineering, Tohoku University (External Expert)
Committee Member Hiroko Yotsumoto	Attorney at Law, Mori Hamada & Matsumoto (External Expert)
Committee Member Nao Taniguchi	Executive Director, National Institute for Materials Science
Committee Member Toshihiko Kamata	Executive Director, National Institute for Materials Science
Member Takahito Omura	Director, Structural Materials Research Center, National Institute for Materials Science

2-2. Scope of the
Investigation

(1) Survey Period

Wednesday, April 2, Reiwa 7 – Wednesday, June 3, Reiwa 8

(2) Scope of the Survey

(1) The papers
subject to the
investigation
are as listed
in the
attached
document.

② Subject of the Survey

○ Joseph Raj Xavier

Former Postdoctoral Researcher, Resource Recycling Design Group, Center for Elemental
Strategic Materials, National Institute for Materials Science (NIMS) (Retired)

○ Toshiya Nishimura

Former Group Leader, Resource Recycling Design Group, Center for Elemental
Strategic Materials, National Institute for Materials Science (NIMS) (retired)

(3) Investigation Methods and Procedures

- Verification of the details of the allegations, confirmation of preliminary investigation results, and confirmation of the policy and methods for the main investigation
- Preservation and verification of research records, such as lab notebooks
- Written inquiries to the subjects of the investigation

- Conducting interviews with the subjects of the investigation
- Verification and analysis of responses to the written survey and interviews

3. Investigation Results

As a result of the investigation into the eight papers under review (Papers 1-8) published between 2014 and 2017, no misconduct was confirmed in one paper (Paper 1), but specific acts of misconduct (fabrication and falsification), among others, were identified in the other seven papers. Specifically, fabrication and falsification were confirmed in scanning electron microscope images, atomic force microscope images, and scanning electrochemical microscope images, among others.

Based on a comprehensive assessment of interviews with the subject of the investigation and responses to the written inquiry, it was determined that Mr. Xavier acted alone in committing this research misconduct. In this case of research misconduct, it was highly likely that figures were reused; there were signs of extensive manipulation, such as scaling the figures to full size, stretching or rotating them, and traces of cutting and pasting parts of images were found in multiple figures. Based on these findings, it was concluded that specific acts of misconduct were committed intentionally.

Regarding Mr. Nishimura, although no evidence was found to suggest his involvement in the specific acts of research misconduct, it was acknowledged that, in Paper 2, as the corresponding author, he had failed to communicate adequately with Mr. Xavier and had been insufficient in reviewing the manuscript. Furthermore, it was confirmed that Papers 3 through 8 were submitted without authorization, with Mr. Nishimura added as a co-author after Mr. Xavier had left the Organization. Based on these findings, while it was determined that Mr. Nishimura himself was not involved in the specific acts of misconduct, it was judged that he bore supervisory responsibility, given that he was Mr. Xavier's supervisor and a partial corresponding author.

Regarding Papers 9-23, which were authored under the names of other affiliated institutions, it was decided to include them in the scope of this investigation due to suspicions that figures from Papers 1-8 had been reused. However, based on the results of the investigation—including interviews with the subject of the investigation—it was confirmed that there is an extremely high likelihood that Mr. Xavier, after leaving the Organization, altered figures used in Papers 1, 2, or 6-8 and improperly used them as figures in Papers 9-23 under the affiliation of another institution. Therefore, the Investigation Committee determined that Papers 1-8, in which the author's affiliation is listed as our organization, would be subject to a determination regarding the presence or absence of misconduct, while Papers 9-23 would not be the primary focus of the determination.

(1) Types of Research Misconduct Determined

① Specific

Acts of

Misconduct:

Fabrication

and

Falsification

n

② Misconduct Other Than

Specific Acts of

Misconduct: Self-

plagiarism

(2) Papers and Other Works Found to Involve Misconduct

An asterisk (*) has been added to the names of the corresponding authors.

Investigation No. Paper Number	Paper Information		Type
Paper 2	Paper Title	Investigation of the Surface Potential on Iron Nanoparticles During Corrosion Using Atomic Force Microscopy (AFM) and Kelvin Probe Force Microscopy (KFM)	Fabrication and Falsification
	Authors	X. Joseph Raj, T. Nishimura*	
	Journal Title	International Journal of Electrochemical Science	
	Publication Date	February 2, 2014	
Paper 3	Paper Title	Galvanic Corrosion Behavior of Iron Coupled to Aluminum in NaCl Solution as Observed by Scanning Electrochemical Microscopy	Fabrication, Falsification, and Self-Plagiarism
	Authors	Joseph Raj, X.*, Nishimura, T.	
	Journal Title	Protection of Metals and Physical Chemistry of Surfaces	
	Publication Date	September 4, 2016	
	Paper Title	Scanning Electrochemical Microscopy for the Investigation of Galvanic Corrosion of Iron with Zinc in 0.1 M NaCl Solution	

Paper 4	Authors	Joseph Raj, X.*, Nishimura, T.	Fabrication, Falsification, and Self-Plagiarism
	Journal Title	Journal of Materials Engineering and Performance	
	Publication Date	January 5, 2016	
Paper 5	Paper Title	Studies on Galvanic Corrosion of an Iron–Magnesium Couple Using Scanning Electrochemical Microscopy in 0.1 M NaCl solution	Fabrication, Falsification, and Self-Plagiarism
	Authors	X. Joseph Raj*, T. Nishimura	
	Journal Title	Journal of Industrial and Engineering Chemistry	
	Publication Date	July 25, 2016	
Paper 6	Paper Title	Evaluation of the Corrosion Protection Performance of Epoxy-Coated High-Manganese Steel Using SECM and EIS Techniques	Fabrication, Falsification, and Self-Plagiarism
	Authors	X. Joseph Raj* & T. Nishimura	
	Journal Title	Journal of Failure Analysis and Prevention	
	Publication Date	April 27, 2016	
Paper 7	Paper Title	Evaluation of the corrosion protection performance of epoxy coatings containing Mg nanoparticles on carbon steel in 0.1 M NaCl solution using SECM and EIS techniques	Fabrication, Falsification, and Self-Plagiarism
	Authors	Xavier, J.R.*, Nishimura, T.	
	Journal Title	Journal of Coatings Technology and Research	
	Publication Date	November 28, 2016	
Paper 8	Paper Title	Electrochemical Investigation into the Effect of Nano-Titania on the Protective Properties of Epoxy Coatings on Mild Steel in Natural Seawater	Fabrication, Falsification, and Self-Plagiarism
	Authors	X. Joseph Raj*, T. Nishimura	
	Journal Title	International Journal of Petrochemical Science & Engineering	
	Publication Date	February 21, 2017	

(3) Researchers Involved in Research Misconduct

○ Researcher identified as “involved in misconduct”

Joseph Raj Xavier

Former Postdoctoral Researcher (now retired) at the Resource Recycling Design Group, Center for Strategic Elements and Materials, National Institute for Materials Science (NIMS); Lead Author

Affected Papers: Paper 2, Paper 3, Paper 4, Paper 5, Paper 6, Paper 7, Paper 8

○ Researchers identified as “authors who, although not involved in the misconduct, bear responsibility for the content of papers and other materials related to research found to have involved misconduct”

Toshiya Nishimura

Former Group Leader, Resource Recycling Design Group, Center for Strategic Element Materials, National Institute for Materials Science (NIMS) (retired), Corresponding Author

Affected Paper: Paper 2

4. Measures Taken by the Organization

○ Based on the above investigation results, as corrective measures for this case, the Institute recommended that Mr. Xavier and Mr. Nishimura retract Papers 2 through 8, which were determined to involve misconduct. Note that the Institute has not received a response from Mr. Xavier indicating whether he will comply with the recommendation within the period specified in the regulations.

○ Furthermore, regarding Papers 9 through 23 among those under investigation, the Investigation Committee determined that they did not constitute research misconduct, in part because they were authored under the affiliation of another institution. However, the Investigation Committee expressed the opinion that the reuse of figures in these papers, among other issues, strongly suggests research misconduct. Consequently, the Organization notified Mr. Xavier to take appropriate measures, including the retraction of the papers, and reported the findings of this investigation to Mr. Xavier’s current institution, requesting that the institution also take appropriate measures, such as conducting its own investigation.

5. Causes of the Misconduct and Measures to Prevent Recurrence

(1) Causes of the Misconduct

During the Investigation Committee’s inquiry, Mr. Xavier consistently refused to submit supporting research data in response to written inquiries and denied any involvement in

research misconduct. After being notified that a hearing would be conducted, he ceased responding, making it impossible to maintain proper communication; consequently, we were unable to ascertain his true intentions regarding why he became involved in such misconduct. On the other hand, based on the interview with Mr. Nishimura and other findings, it is believed that the following factors may have contributed to the incident.

- Mr. Xavier's lack of awareness regarding research integrity compliance
- Given the difficulty of finding postdoctoral positions in Mr. Xavier's home country, he may have felt a strong desire to increase his number of publications in order to secure his next position
- Inadequate verification and management of some lab notebooks and experimental data within Mr. Nishimura's research group

(2) Measures to Prevent Recurrence

To prevent misconduct in research activities, our organization has, to date, established relevant regulations and systems, conducted research ethics training via e-learning, and introduced tools to detect plagiarism and other forms of misconduct.

Although this incident occurred prior to the implementation of these measures, in light of the aforementioned contributing factors, we will consider and implement the following measures to prevent recurrence in the future.

- We will conduct research ethics training in both Japanese to enhance compliance awareness regarding research integrity.
- We will once again thoroughly publicize and ensure compliance with the rules regarding the preservation and management of research records.
- We will ensure that pre-submission reviews of manuscripts are conducted thoroughly, including verification of the roles and relationships between the corresponding author and co-authors.

(Attachment) Papers Subject to Investigation

- The names of the corresponding authors are marked with an asterisk (*).

Paper 1	Paper Title	Corrosion Protection Performance of Epoxy-Coated High-Tensile Strength of Steel Measured Using Scanning Electrochemical Microscopy and Electrochemical Impedance Spectroscopy Techniques
	Authors	Xavier Joseph Raj, Toshiyasu Nishimura*
	Journal Name	ISIJ International
	Publication Date	March 15, 2014
Paper 2	Paper Title	Investigation of the Surface Potential on Iron Nanoparticles During Corrosion Using Atomic Force Microscopy (AFM) and Kelvin Probe Force Microscopy (KFM)
	Authors	X. Joseph Raj, T. Nishimura*
	Journal Name	International Journal of Electrochemical Science
	Publication Date	February 2, 2014
Paper 3	Paper Title	Galvanic Corrosion Behavior of Iron Coupled to Aluminum in NaCl Solution as Observed by Scanning Electrochemical Microscopy
	Authors	Joseph Raj, X.*, Nishimura, T.
	Journal Name	Protection of Metals and Physical Chemistry of Surfaces
	Publication Date	September 4, 2016
Paper 4	Paper Title	Scanning Electrochemical Microscopy for the Investigation of Galvanic Corrosion of Iron and Zinc in 0.1 M NaCl Solution
	Authors	Joseph Raj, X.*, Nishimura, T.
	Journal Name	Journal of Materials Engineering and Performance
	Publication Date	January 5, 2016
Paper 5	Paper Title	Studies on Galvanic Corrosion of an Iron–Magnesium Couple Using Scanning Electrochemical Microscopy in 0.1 M NaCl Solution
	Authors	X. Joseph Raj*, T. Nishimura
	Journal Name	Journal of Industrial and Engineering Chemistry
	Publication Date	July 25, 2016
Paper 6	Paper Title	Evaluation of the Corrosion Protection Performance of Epoxy-Coated High-Manganese Steel Using SECM and EIS Techniques
	Authors	X. Joseph Raj* & T. Nishimura
	Journal Name	Journal of Failure Analysis and Prevention
	Publication Date	April 27, 2016
Paper 7	Paper Title	Evaluation of the Corrosion Protection Performance of Epoxy Coatings Containing Mg Nanoparticles on Carbon Steel in 0.1 M NaCl Solution Using SECM and EIS Techniques
	Authors	Xavier, J.R.*, Nishimura, T.
	Journal Name	Journal of Coatings Technology and Research
	Publication Date	November 28, 2016

Paper 8	Paper Title	Electrochemical Investigation into the Effect of Nano-Titania on the Protective Properties of Epoxy Coatings on Mild Steel in Natural Seawater
	Authors	X. Joseph Raj*, T. Nishimura
	Journal Name	International Journal of Petrochemical Science & Engineering

	Publication Date	February 21, 2017
Paper 9	Article Title	Application of EIS and SECM Studies to Investigate the Anticorrosion Properties of Epoxy Coatings Containing ZrO ₂ Nanoparticles on Mild Steel in 3.5% NaCl Solution
	Authors	Joseph Raj Xavier*, Rajendran Nallaiyan
	Journal Name	Journal of Failure Analysis and Prevention
	Publication Date	October 14, 2016
Paper 10	Article Title	Application of EIS and SECM Studies to Investigate the Anticorrosion Properties of Epoxy Coatings Containing Zinc Oxide Nanoparticles on Mild Steel in a 3.5% NaCl Solution
	Authors	Joseph Raj Xavier*
	Journal Name	Journal of Materials Engineering and Performance
	Publication Date	June 13, 2017
Article 11	Article Title	Investigation on the Effect of Nano-Ceria on Epoxy Coatings for Corrosion Protection of Mild Steel in Natural Seawater
	Authors	Joseph Raj Xavier*
	Journal Name	Anti-Corrosion Methods and Materials
	Publication Date	January 2, 2018
Paper 12	Article Title	A Comparative Study of the Corrosion Behavior of Mild Steel Nanoparticles in Natural Seawater and in 3.5% NaCl Solution Using AFM and KFM Techniques
	Authors	Joseph Raj Xavier*
	Journal Name	Journal of Failure Analysis and Prevention
	Publication Date	February 13, 2018
Paper 13	Article Title	Comparative Corrosion Behavior of Carbon Steel and High-Chromium Steel Nanoparticles
	Authors	Joseph Raj Xavier*
	Journal Name	Research Journal of Nanoscience and Engineering
	Publication Date	October 8, 2018
Paper 14	Article Title	Investigation into the Effect of Cr ₂ O ₃ Nanoparticles on the Protective Properties of Epoxy Coatings on Carbon Steel in 3.5% NaCl Solution by Scanning Electrochemical Microscopy
	Authors	Joseph Raj Xavier*
	Journal Name	Protection of Metals and Physical Chemistry of Surfaces
	Publication Date	May 13, 2019
Paper 15	Article Title	Investigation on the Anticorrosion, Adhesion, and Mechanical Performance of Epoxy Nanocomposite Coatings Containing Epoxy-Silane-Treated Nano-MoO ₃ on Mild Steel

	Authors	Joseph Raj Xavier*
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	Journal Name	Journal of Adhesion Science and Technology
	Publication Date	September 10, 2019
Paper 16	Article Title	Effect of Surface-Modified WO ₃ Nanoparticles on the Adhesive and Anticorrosion Properties of Epoxy Coatings on Mild Steel
	Author	Joseph Raj Xavier*
	Journal Name	Journal of Applied Polymer Science
	Publication Date	August 5, 2019
Paper 17	Article Title	Experimental Investigation of a Hybrid Epoxy-Silane Coating for Enhanced Protection Against Corrosion of Aluminum Alloy AA7075 Frame in Solar Cells
	Author	Joseph Raj Xavier*
	Journal Name	Macromolecular Research
	Publication Date	December 2, 2019
Paper 18	Article Title	Enhanced Adhesion and Corrosion Protection Properties of Surface-Modified Sb ₂ O ₃ -Epoxy Nanocomposite Coatings on Mild Steel
	Author	Joseph Raj Xavier*
	Journal Name	Journal of Failure Analysis and Prevention
	Publication Date	March 14, 2020
Paper 19	Article Title	Electrochemical, Mechanical, and Adhesive Properties of Surface-Modified NiO-Epoxy Nanocomposite Coatings on Mild Steel
	Author	Joseph Raj Xavier*
	Journal Name	Materials Science and Engineering: B
	Publication Date	July 29, 2020
Paper 20	Article Title	Electrochemical and Mechanical Studies of Epoxy Coatings Containing Eco-Friendly Nanocomposite Consisting of Silane-Functionalized Clay-Epoxy on Mild Steel
	Author	J. Raja Beryl, Joseph Raj Xavier*
	Journal Name	Journal of Bio- and Tribo-Corrosion
	Publication Date	September 19, 2020
Paper 21	Article Title	Effect of graphene oxide-coated functional silicon carbide on structural, surface protection, water-repellent, and mechanical properties of an epoxy matrix for automotive structural components
	Author	S.P. Vinodhini, Joseph Raj Xavier*
	Journal Name	Colloids and Surfaces A: Physicochemical and Engineering Aspects
	Publication Date	January 13, 2022
	Article Title	Electrochemical and mechanical investigation into the effects of polyacrylamide/TiO ₂ in polyurethane coatings on mild steel structures in chloride media

Paper 22	Author	Shanmuga Sundari Chandraraj & Joseph Raj Xavier*
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	Journal Name	Journal of Materials Science
	Publication Date	July 12, 2022
Paper 23	Article Title	Improvement in Corrosion Resistance and Mechanical Properties of Epoxy Coatings on Steel with the Addition of Thiadiazole-Treated ZrC
	Authors	Joseph Raj Xavier*
	Journal Name	Journal of Materials Engineering and Performance
	Publication Date	October 3, 2022