日本―アフリカ　国際共同研究「環境科学」 2023 年度　年次報告書	
研究課題名（和文）	鉱業活動の影響を受ける環境における汚染物質の迅速な検出、修復、および利害関係者の認識による持続可能な幸福
研究課題名（英文）	Sustainable well-being through rapid detection, remediation and stakeholder awareness of contaminants in environments impacted by mining activities
日本側研究代表者氏名	ジェズニチカ イザベラ イレナ
所属・役職	芝浦工業大学・工学部 先進国際課程・教授
研究期間	2023 年 4 月 1 日　～　2025 年 3 月 31 日

1．日本側の研究実施体制

氏名	所属機関・部局・役職	役割
ジェズニチカ イザベラ イレナ	芝浦工業大学・工学部・教授	Developing a smartphone-enabled method for quantification of copper ions in water samples from Botswana mining town
フェスタガード ムンデランジ・キャサリン・ムタンゲーイ	鹿児島大学・農学部・准教授	Synthesis of copper nanostructures and their incorporation with ceramic filtration materials/filters
オレチェク　シルヴィア	京都大学・大学院工学研究科・特定助教	Clarification of adsorption of heavy metals on microplastics in water and soil system under various conditions.

2．日本側研究チームの研究目標及び計画概要

Research goals of Japanese team in FY 2023 are to; 1) synthesize copper nanostructures from copper salts and copper separated from the samples collected in

Botswana in FY 2022, and use it for the preparation of antimicrobial copper nanostructures forms that will be used to decorate ceramic water filters made by South African team; 2) clarify adsorption of heavy metals on the aged and non-aged microplastics in water and soil medium; and 3) evaluate the smartphone-enabled detection system for the quantification of copper ions in water samples having physico-chemical properties of water samples collected in FY 2022 in the vicinity of Selebi-Phikwe mining town in Botswana.

3. 日本側研究チームの実施概要

The SusMine project aims at solving various environmental problems facing local communities living in areas of Selebi-Phikwe copper-nickel mine in Botswana.

In FY 2023, Japanese Team has 1) developed a new smartphone-enabled method for quantification of copper ions in water and tested water samples from Botswana for HMs content; 2) synthesized copper nanostructures from the agriculture wastes and tested their antimicrobial effects towards *E.coli*; 3) collected data on the spatial distribution of microplastics and heavy metals in freshwater systems in Botswana; and 4) evaluated adsorption of heavy metals to microplastics in water solutions.

One online research workshop was held at the University of Johannesburg where Japanese Team reported current research progress of the SusMine Project.

In addition to the research activities, Japanese Team members gave a series of online lectures to the high school students in Selebi-Phikwe mining town in Botswana, as well as to the undergraduate students at the Department of Chemical Sciences, University of Johannesburg, South Africa.

A training in the subject of environmental pollution control was held under the Sakura Science Exchange Program at Kyoto University for researchers and students from Botswana International University of Science and Technology.