

## FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

**Project Title:** Removal and recovery of phosphate from wastewater by microbial fuel cell

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### 1. Background of research

It is predicted that phosphate rock might be run out within decades. Since there are currently no alternates for phosphate fertilizer, the shortage of phosphate results in shrinking of food production. Recent years, many approaches for phosphate recovery from wastewater has been promoted worldwide, since wastewater such as sewage or animal wastewater contains a great amount of phosphate. However, present recovery technology requires high cost and a lot of power. Microbial Fuel Cell is one of the technologies of energy recovery from wastewater. We found phosphate can be removed by this technology, together with power generation.

### 2. Research objectives

We aim to elucidate the detailed mechanism of phosphate removal by Microbial Fuel Cell, and to propose effective recovery method of the removed phosphate.

### 3. Research characteristics (incl. originality and creativity)

Existing phosphate recovery technologies are secondary treatment process after wastewater treatment and it cost highly. Our process is wastewater treatment process and at the same time phosphate recovery process. Therefore it requires no extra cost for secondary treatment. And also, this is the first process which enables simultaneous energy and phosphate recovery.

### 4. Anticipated effects and future applications of research

Exporting countries have started placing a tariff on export of phosphate rock. Japan is a country, relying all phosphate rock on import. Therefore the phosphate recovery from wastewater has great importance. Furthermore, our research might be expanded to the new field of resource recovery such as precious metals and rare earths.