Interconnection between Material Synthesis and Recycling Process for Enhanced Sustainability of Platinum

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Submission Category:
(A) Technical research proposal to solve concrete problems

SDGs Targets/Indicators:
SDGs targets #9.4 and #12.2 are mainly addressed in this proposal. A way to enhance sustainability of platinum is suggested from the viewpoints of efficient use and resource management.

Abstract:
Stable supply of Pt is crucial for sustainable development of technologies. In this proposal, a facile resource cycle system of Pt is suggested. The authors have realized that Pt ions are reduced in nanomaterial synthesis, and metal Pt is oxidized in recycle system. Therefore, material synthesis and recycling process will be interconnected each other by properly controlling oxidation-reduction reaction of Pt, leading to the sustainable Pt cycle system. Until now, Pt electrocatalysts, which show higher catalytic activity than the commercial Pt catalysts, have been synthesized from recycling intermediates. For completion of the Pt cycle system, the authors will develop a green leaching method to dissolve Pt without using aqua regia, followed by preparing the recycling intermediates. The already developed active electrocatalysts will be synthesized from the recycling intermediates prepared by the green recycling process, and effects on catalytic activity derived from spent materials will be also evaluated.

Graphical Abstract: