

Innovation in manufacturing for new process of sustainable resource recycle

Development of P-Innovation Technology

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Summary :

Yellow phosphorus (P_4) is one of the essential and strategic industrial materials. For example, food, chemical, electrical and medical industries can not produce many commodities without high quality yellow phosphorus. In spite of such importance, many countries are facing serious risk of stable supply of yellow phosphorus because yellow phosphorus is currently produced only in four countries (USA, China, Kazakhstan and Vietnam) and some of them strictly limit the export. In addition, the conventional yellow phosphorus production process consumes huge electric power (14MWh/t). Thus, finding a new source and developing a green process for yellow phosphorus production are highly expected.

Goal: Our research group has pointed out that the steelmaking slag has considerable high potential as a new secondary source of phosphorus. This project aims to develop new green process of yellow phosphorus production from unutilized secondary phosphorus sources such as steelmaking slag.

Web site of PL <http://www.material.tohoku.ac.jp/~tekko/index.html>

Phosphorus crisis

World market of yellow phosphorus
720 kt, 23 billion US\$ (2014)

What's the Problems;

- Very limited phosphorus suppliers, in particular, yellow phosphorus



- Huge energy consumption process

Our solution;

Yellow phosphorus is produced with much efficient process from new phosphorus source such as steel-making slag which has sufficient reserve.



steelmaking slag