Progress of Phosphorus Recycling

Path-breaking Project in Bavaria: Technical and Scientific Coordination by KIT – Pilot Plant Starts Operation

Decisive phase: The phosphorus recovery method that has been further developed by KIT is now tested in a pilot project. (Photo: CMM)

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Phosphorus is a vitally important element, its resources are finite and irreplaceable. Usable resources worldwide will suffice for about another 100 years. KIT scientists have now optimized a method to recover phosphorus from wastewater. This method is used in a pilot project at the wastewater treatment plant of the city of Neuburg in Bavaria. On Thursday, May 12, the plant will start operation.

The project that started in spring last year is coordinated technically and scientifically by the Competence Center for Material Moisture (CMM) of KIT. Now, the third and decisive phase is starting. Laboratory and semi-technical experiments were successful. “Based on these experiments, we expect a successful operation of the wastewater treatment plant in the pilot phase,” says the Head of CMM, Dr. Rainer Schuhmann.

The project is aimed at separating a part of the phosphorus from the wastewater and at recycling it as a raw phosphate substitute. For this purpose, the P-RoC (Phosphorus Recovery from Waste and Process Water by Crystallization) has been further developed by the researchers under the direction of Schuhmann. In this way, phosphate dissolved in the wastewater phase can be recovered as a phosphate-containing product by crystallization on calcium silicate hydrate phases (CSH). Schuhmann explains that the simple and effective principle "yields a product that can be used as a fertilizer without any further processing." Cooperation partners are the companies of Cirkel GmbH & Co. KG, Rheine, and HeidelbergCement AG.

If everything proceeds as planned, the pilot phase at Neuburg will be completed in about half a year. Then, an evaluation will be made in order to determine technical and economic efficiencies of the process. "After this, we will know whether 20, 30 or even more percent of the about 30 tons of phosphorus arising annually can be recovered from the wastewater at Neuburg," says Rainer Schuhmann. But the scientists are sure: "The quality of the recycled phosphorus is excellent, because it is completely available to plants and supplies several nutrients."

After the pilot phase, the project partners will also decide whether phosphorus recovery may be a new source of income for municipalities like Neuburg. After all, the costs of a ton of phosphate ore on the commodity market increased from 40 to 430 US$ from April 2007 to August 2008. Presently, the price is 120 US$ per ton.

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