

Researchers convert carbon dioxide into a valuable resource

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Credit: Aalto University

Researchers at Aalto University have opened a pilot plant that converts CO₂ and slag, the by-product of steel manufacturing, into a valuable mineral product. The product, Precipitated Calcium Carbonate (PCC), is used in e.g. plastics, papers, rubbers and paints. The innovative plant represents the next stage prior commercialization of a new process that consumes CO₂ in order to convert a low-value by-product into a highly

valuable resource for industry.

The potential economic and environmental benefits of this new technology are significant. "We are turning the industrial solid by-product from steel-manufacturing into a product which is 50 times more valuable," says Arshe Said, a postgraduate researcher at Aalto University. "Also, this process actually consumes CO₂ and acts as a CO₂ sink which benefits the environment greatly."

Current methods of PCC production require burning large amounts of limestone. "The conventional method involves large mining activities and has high CO₂ emissions," points out Sanni Eloneva, D.Sc. (Tech).

Carbon intensive [manufacturing industries](#) are coming under increasing pressure from bodies such as the EU to reduce [greenhouse gas emissions](#). "We believe this [pilot plant](#) will help to efforts by these industries to conform with government imposed emissions and waste targets," explains Professor Mika Järvinen.

In 2010, 13% of the total steel slag produced in Europe (16 Mt) went to the landfill. "In theory, if all the calcium in this steel slag could be recovered, approximately 13 Mt PCC/year could be produced, simultaneously sequestering nearly 6 Mt CO₂/year," Järvinen continues.

The highly promising new technology also has other potential advantages. "We are currently investigating the possibility of extracting other valuable materials from the slag after the extraction of calcium", says Said.

The pilot PCC plant is now running in Otaniemi campus of Aalto University. The method used in the pilot is based on the patent owned by Aalto University Foundation together with Åbo Akademi and Rautaruukki Oyj (now part of SSAB).

More information: Researchers' article on the pilot plant:
viewer.zmags.com/publication/649b3363#/649b3363/74, Project
Magazine UK

Researchers' article on the technology: www.sciencedirect.com/science/.../ii/S0306261912009336

Sanni Eloneva's Doctoral dissertation (2010): Reduction of CO₂ emissions by mineral carbonation: steelmaking slags as raw material with a pure calcium carbonate end product,
lib.tkk.fi/Diss/2010/isbn9789526034577/

Provided by Aalto University

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