

Researchers invent cleaner way to produce concrete

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Canadian Light Source (CLS) user Mark MacDonald is helping build better communities one concrete block at a time.

[Concrete](#) is one of the most important building materials, says MacDonald, but the problem is that the production of cement, the glue that makes concrete so strong, releases a lot of [CO2 emissions](#).

The [cement industry](#) is one of the largest industrial CO2 emitters in North America, so MacDonald is working to reduce that impact with the Canadian [clean technology](#) company, CarbonCure.

CarbonCure is devoted to making sustainable concrete - which also happens to be stronger than regular concrete in the earlier hardening stages. The process works by using CO2 captured from industrial emitters and actually re-introducing it in the manufacturing of concrete products.

The CO2 gets directly injected into concrete, where it gets converted into a stone-like mineral that becomes a permanent part of the concrete mixtures.

In the end, they not only cut the CO2 being released into the atmosphere, but their products also out-perform regular concrete.

MacDonald said the environmental gains are potentially enormous.

"Concrete has been around for centuries, and it's one of the most common [construction materials](#) in the world," MacDonald said. "There has been many small changes to make concrete more environmentally friendly, but CarbonCure's process is a new, innovative way to reduce the CO2 footprint of concrete."

MacDonald, a recent Dalhousie MSc. Chemistry grad, is the CarbonCure innovation manager. He is part of an innovative team, and is involved in the constant research and development and testing of new applications for green concrete.

During his Master's and undergraduate degrees, MacDonald worked for Dr. Peng Zhang and studied [gold nanoparticles](#) using synchrotron techniques. This work brought him to the CLS three times during his studies.

"The CLS is a great learning experience. You're only there for three days, and you come back with data that takes six months to analyze."

All of that hard work contributed to MacDonald earning the Governor General's Gold Medal in Natural Sciences, as the most outstanding Master's graduate in science and engineering.

He carried the same drive over to CarbonCure.

"After graduation, I was looking for a job that was exciting and fast-paced. CarbonCure has offered the chance to make a positive change in a field that needed some innovation."

Producing green concrete for specific customers provided just the right kind of challenge.

CarbonCure works with individual concrete producers to incorporate

their technology into the existing production and reduce its overall footprint.

The company is currently working with concrete manufacturers in Nova Scotia, Ontario and California, and is in the process of screening other manufacturers as they roll out their concrete innovation across North America.

Provided by Canadian Light Source

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