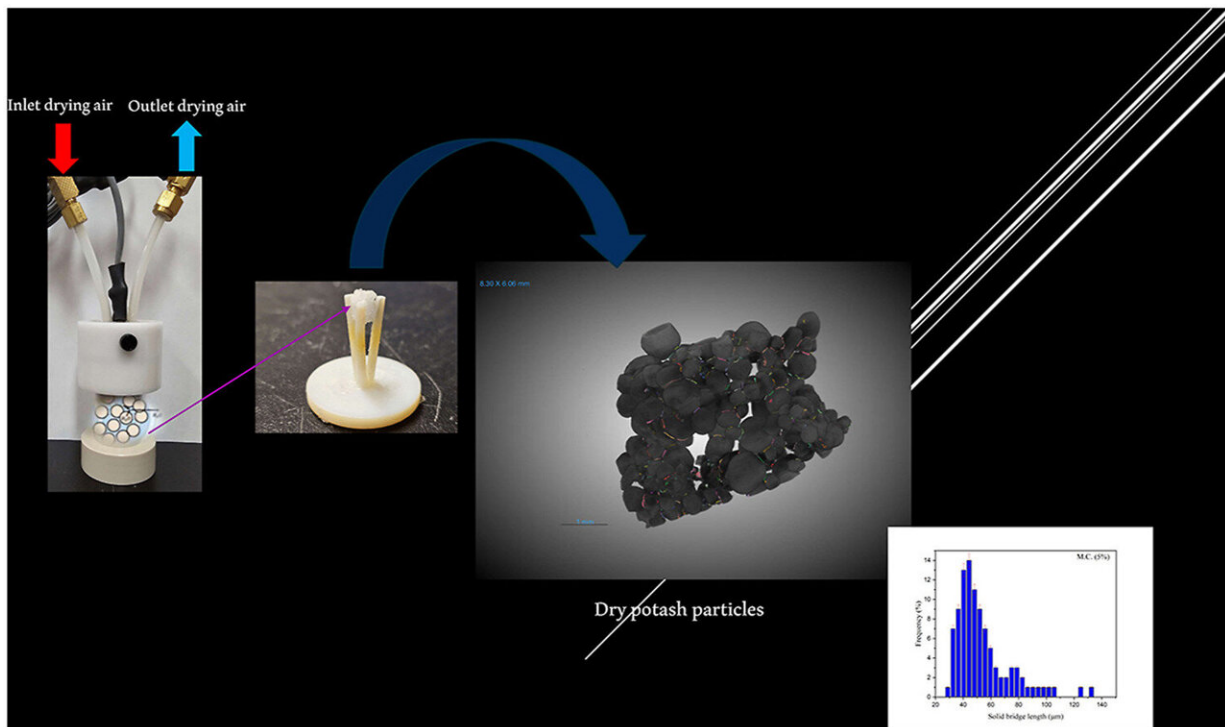


Finding solutions to problem of clumping in potash-based products

July 24 2024, by Rowan Hollinger



Graphical abstract. Credit: *Particuology* (2024). DOI: 10.1016/j.partic.2024.04.012

When powdered products like sugar, salt, or instant coffee are exposed to moisture, they form clumps and become much harder to use. The same thing happens to potash-based fertilizers and other potash products, where clumping can lead to industrial and agricultural waste. That's why

Saskatchewan researchers are taking a closer look at studying why clumps form in powdered products and what can be done to avoid this.

Dr. Lifeng Zhang recently came to the Canadian Light Source (CLS) at the University of Saskatchewan (USask) with other members of USask's Particle Technology Research Lab, and used the BMIT-BM beamline to study in real time how clumps form in potash products.

"This research is the first one actually looking into the caking and clumping [phenomena](#) using X-ray imaging," says Zhang. "Previously, other methods or instruments have been used, but they cannot see this [dynamic process](#)."

The team used a technique called synchrotron-based X-ray tomography to take detailed 3D images of potash particles and the tiny bridges that form between them, which create the [clumps](#).

"Something other methods cannot see," Zhang continues, "here we can see it using synchrotron-based X-ray imaging. I can see that small-scale spread or caking occurring within minutes—that's really exciting."

This research, done in collaboration with industry partner Mosaic, originally set out to study ways of improving the drying process for potash products, but the research evolved when they discovered that clumping was occurring not only after, but also during the drying process. The team's findings were [published](#) in the journal *Particuology*.

"This research is just the beginning of improving our understanding of how the clumping phenomena occurs," says Zhang. "We hope that the knowledge from this research will help industry reduce waste or even help, for example, our farmers when they apply this product in the field to reduce waste as well."

Zhang and the team hope to continue working with Mosaic to find ways to improve manufacturing/drying processes. The team also hopes to one day expand their research to study the clumping phenomena in other powdered products.

More information: Mojtaba Nabipoor Hassankiadeh et al, Synchrotron X-ray micro-computed tomography imaging of solid bridges between potash particles near contact points, *Particuology* (2024). [DOI: 10.1016/j.partic.2024.04.012](https://doi.org/10.1016/j.partic.2024.04.012)

Provided by Canadian Light Source

Citation: Finding solutions to problem of clumping in potash-based products (2024, July 24) retrieved 24 July 2024 from <https://phys.org/news/2024-07-solutions-problem-clumping-potash-based.html>

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